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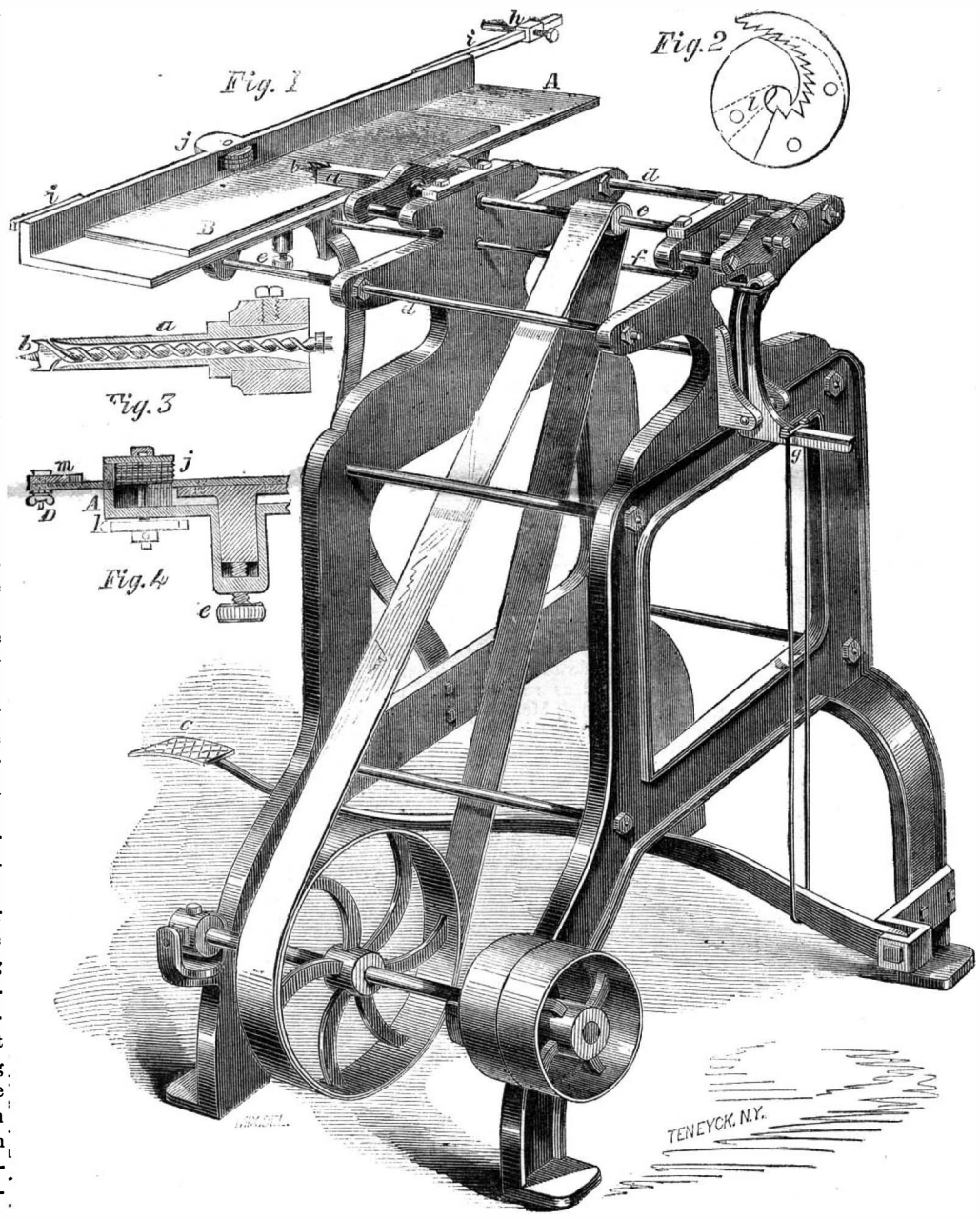
MACHINE FOR MAKING SASH AND BLINDS.

All simple operations in the arts which are repeated a great number of times are either performed, or destined to be performed, by machinery. The mortising and tenoning of sash for windows, the boring of the stiles for the slats of window-blinds, and the cutting and forming of the pivots of the slats by the aid of steam power, have been the objects of much invention; and the machinery for this purpose is being brought, by the ingenuity of our mechanics, more and more nearly to perfection. We give herewith an illustration of a machine by which the several operations of boring the stiles, and forming the pivots of the slats, and mortising the sash, may all be performed.



AXE'S MACHINE FOR MAKING SASH AND BLINDS.

Fig. 1 is a perspective view of the whole machine; Fig. 2, the tool for cutting the pivots; Fig. 3, the mortising-chisel and lever; Fig. 4, a cross section of the table. A is a table which slides on the rods, *d d*, and B a second table within A, having a vertical motion, as represented in Fig. 4. For mortising sash, the bar to be mortised is laid on the table, B, against the upright portion of the table, A; the table, B, being adjusted by the thumb-screw, *e*, to the thickness of the bar. By pressing down the foot-lever, C, the rod, *f*, is drawn by the elbow, *g*, and thus the table, A, with the sash bar to be mortised, is forced against the cutting-tool, *a b*. This tool consists of an auger which has its cutting end enlarged, working in a hollow, rectangular chisel. After the auger has bored the round hole, the slight cutting required to square the corners of the mortise is accomplished by pressing the foot upon the lever, C, forcing the hollow chisel into the wood. The distance between two mortises, varying with the size of the glass, is adjusted by sliding the two indexes (only one of which, *h*, is shown in the cut) upon the two square rods, *i i*.

In boring stiles for blinds, the square chisel is removed, and an auger of the proper size is placed in the end of the spindle, *c*. The stile is placed on the table firmly against the upright back, the foot pressed on the lever, C, and a hole bored. The stile is then pushed along lengthwise, still held firmly against the back of the table as it moves, turning the serrated roller, *j*, until the ratchet wheel, *k*, which is on the same shaft as the roller, is stopped by a pawl. In this way the holes are made at precisely the same distance apart, which distance is fixed by the distance apart of the teeth in the ratchet wheel, *k*.

To form the pivots on the ends of the slats, the wheel, *j*, is removed, and a slide, D, is introduced through the mortise in the perpendicular back of the table. The auger is also taken from the spindle, *c*, and in its place is substituted the cutting-tool, of which the end is represented in Fig. 2. The slat being placed lengthwise on the slide, D, and the foot-lever, C, pressed, the end of the slat is brought against the teeth of the cutting-tool which cuts away the outer portions of the end of the slat and leaves the pivot in the middle. A knife, *l*, cuts off the end of the pivot, being adjustable at different distances from the teeth to vary the lengths of the pivots. The lengths of the slats are determined by sliding the block, *m*, along the slide, D.

This machine was patented by William R. Axe, of Beloit, Wis., Sept. 20, 1859. For further information, address Farr & Hill, of the same place.

METHOD OF CLEANING AND RESTORING OIL-PAINTINGS.—Good paintings have often been coated with varnish with an idea of preserving them; but the varnish, being of a bad quality, has, after a few days, done more harm than good by its becoming discolored. To restore such paintings, it is necessary to remove the discolored varnish. This may be done either with strong spirit or with soft soap and water; both means, of course, requiring great care. We prefer the use of spirit, because the varnish is dissolved by it, but the oil colors are not; but when the artist's touches are on the glaze, spirit must not be used. One ounce of soft soap, melted in a quarter of a pint of water, brushed over the painting, will so dissolve the varnish in the course of half an hour or so, that it may be removed with a sponge and warm water, and thus leave the picture clear. Still, the age of the varnish and its nature may be such that this operation has to be repeated several times. It must be remembered, however, that when the varnish is thus removed, the oil colors will also be attacked by the soft soap; hence, careful manipulation becomes necessary. Very strong spirit laid on the varnish will also dissolve it, and it must be removed with a sponge or camel's hair brush as soon as it becomes tacky. This process is more expensive for cleaning pictures; but there is no fear of the spirit dissolving the oil colors unless they are the touches often added by the artist on the glaze. When the painting is free from its artificial coat, the colors may be brightened by brushing them over with Thenard's peroxyd of hydrogen. This, however, being both expensive and difficult to procure, M. Schonbein, of Basle (the inventor of gun-cotton), has suggested the use of oxydized oil of turpentine for the same purpose. The turpentine is placed in a shallow vessel, and fully exposed to the sun (being, at the same time, frequently agitated) for two months, and becomes oxygenated in a high degree. If this liquid is brushed over lead colors that have been discolored by the sulphur in the air, they rapidly assume their pristine beauty. In cleaning pictures with spirit, the painting must be rubbed over with a little sweet oil after the spirit is removed; this prevents further action of the spirit on the color. It is a good plan to apply the spirit with a sponge covered with a linen rag, in the manner and with the rotary motion of French-polishing.—*Septimus Piesse.*

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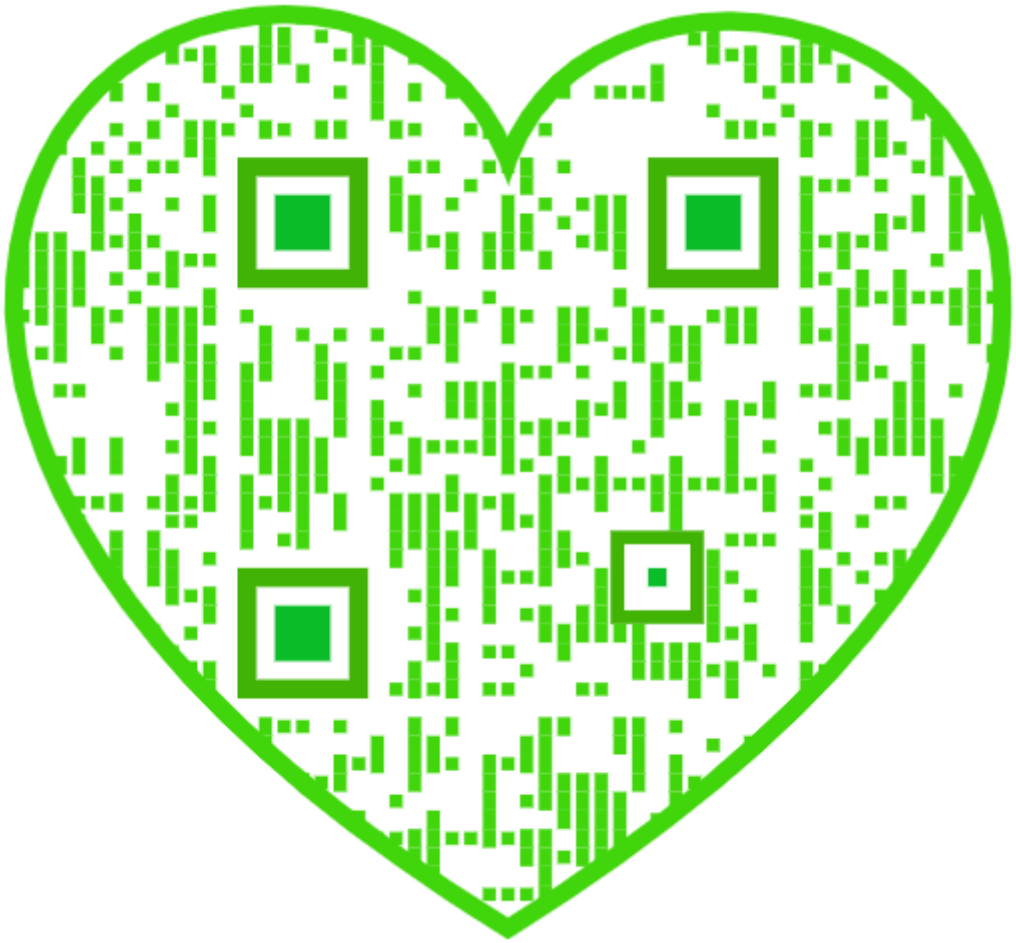

THE MANUFACTURES OF PATERSON, N. J.

EARLY HISTORY—THE SOCIETY FOR ESTABLISHING USEFUL MANUFACTURES—ALEXANDER HAMILTON—THE FIRST COTTON MILL AND PRINT-WORKS.

Within the recollection of persons still living, the site of the active and prosperous city of Paterson consisted of little except swamps and woodlands. One tavern and three or four farm-houses stood near the only avenue by which the Falls could be reached from the direction of New York. The first of these edifices, now part of the "Passaic Hotel," alone survives as a relic of the past, when the cataract, like the dusk-complexioned wanderers around it, rejoiced in the exuberance of physical strength, ere the spinning-frame or the locomotive had been born of the human brain. Be it ours to chronicle the reverses and triumphs of organized industry, during a struggle of seventy years' duration, in the neighborhood of this interesting locality.

Nature evidently set apart that region as a vast field for manufacturing operations. In its mountains she locked up inexhaustible deposits of iron ore, of prime quality, and easy access. Their sides she clothed with dense forests. The plains she spread out upon a ground floor of old red sandstone, every here and there showing itself in graceful swelling or modestly hiding underneath the tall, grim cliffs of "trap," which she drew in vast lines parallel to the ocean shore. The best of harbors and the furthest navigable of Atlantic rivers were placed within sight; several chains of mountains, rising from 200 to 2000 feet, approached almost to the very margin of "the great deep," and across these she diverted the Passaic, at each of the passages precipitating itself from 50 to 100 feet. It needed only human intellect and skill to render that region one of the most productive and wealthy as well as picturesque on the face of the globe.

Imbued alike with sound sense and earnest patriotism, the founders of our republic felt that independence had been only half secured by the Revolutionary War. With the formation of "a more perfect Union," therefore, many leading spirits of that day began to turn their attention to the fabrication of those articles pertaining to the national kitchen. Samuel Slater, an Englishman, in 1789, had landed at New York with Arkwright's spinning-frame in his brain, the British government forbidding a model of it to be stowed in his trunk. In the following year he was engaged to construct and superintend these machines at Pawtucket, R. I.; the first ever put into operation on this continent.

In the early part of 1791, mainly through the exertions of Alexander Hamilton, an association of persons in the Middle States was formed to undertake manufacturing operations on an extensive scale. Application for an act of incorporation was made to the New Jersey Legislature, and a charter, which had been drawn up or revised by Hamilton, received the signature of Governor Paterson on the 22d of November following. This was one of the most liberal that could be devised, leaving the grantees unrestricted as to the locality to be selected, the time of commencement, or the period of duration. The capital stock was fixed at $1,000,000, in shares of $100 each; but real estate and other property might be held to the extent of four millions. Besides manufacturing, they might improve navigation by the construction of canals, locks, dams, &c., and charge tolls for the same. Their property was exempted from taxation ten years for State purposes, and for county and township purposes for ever. They might also raise $100,000 by lottery, if required. The inhabitants within a district six miles square might at any time be incorporated and form a municipal government, with the usual powers, privileges, and duties.

"The Society for Establishing Useful Manufactures" was immediately afterwards organized, when William Duer was elected governor, and Archd. Mercer, deputy-governor. The stock subscription then amounted to $200,000, but was afterwards increased to $262,000. The first business was to select a suitable location for their works; accordingly, advertisements were inserted in New York, Philadelphia and Trenton papers, inviting proposals. These were received from the West Jersey Associates, from South River, Perth Amboy, Millstone, Bull's Falls, the Little Falls, and the Great Falls of the Passaic, setting forth their several advantages. Engineers were sent to survey and report upon each. That of Cassimer T. Grover, then Surveyor of New York, estimates the power of the Great Falls, including the descent to tide water, as equal to 247 undershot wheels, and that of the Little Falls as equal to 78. Besides the excellence of the quarries and the abundance of timber, the practicability of improving navigation to the head-waters of that river is duly pointed out, and the directors are informed that bog iron ore is found near the Little Falls suffieient for very extensive works, also beds of red ocher, &c., &c. It is noticeable that all the first surveys contemplate the carrying of the Passaic by a canal to tide-water, near Acquackanonk. Christopher Collis, who made a hasty exploration of the spot, states that a cutting of 15 feet would be required for that purpose.

A meeting of the residents in that part of (then) Essex county was held at the house of John Stagg, in Acquackanonk, when a committee consisting of John Benson, William Colfax, and Abraham Godwin, was appointed to confer with the society. They were to point out the abundant supply of everything needed for a great manufacturing emporium, and to offer part of their lands—every alternate three-acre lot—at a reasonable valuation; finally, a portion of these might be given gratuitously, if nothing better would serve. A meeting was also held at Little Falls, when propositions were submitted for acceptance. Gov. Duer appears to have favored the latter, but a committee to whom the subject had been referred thought differently, and on May 17, 1792, resolved that the town of Paterson (named after the Governor) should be located at the Great Falls of the Passaic.

The cotton manufacture had from the first been considered the society's grand object, but their attention was at various times directed to other branches of industry. The governor was instructed to treat with "one Hancart who has a very superior knowledge" of the manufacture of tobacco, for his services. This project, however, was subsequently abandoned, whether because it could not be ranked among the "useful" species, we are not aware. Meantime, a purchase of nearly 700 acres of land, together with the river bed above and below the falls, was made at a total cost of only $8,230. Nehemiah Hubbard was appointed the first engineer and superintendent. He was succeeded by Major L'Enfant, a Frenchman of very extravagant ideas. In his first report this gentleman recommends the water to be conveyed in a canal to the Great Notch, a distance of three or four miles, before using it!

As a matter of interest we insert here a letter from Col. Hamilton, announcing the appointment of a number of subordinates:—

PHILADELPHIA, Dec. 7, 1791.

GENTLEMEN:—In consequence of powers vested in me by the agents named in the instrument of subscription towards the Society for Establishing Useful Manufactures, I have made contracts on behalf of the society with William Hall as superintendent of the Printing business; with Joseph Mort as an assistant in the manufactory in such a way that his services may be thought most useful. This gentleman, I understand, has had opportunities of being acquainted both with the making and printing of cotton goods. With Thomas Marshall to superintend the Cotton Mill.

The contracts with these different persons are transmitted herewith.

There is a William Pearce who has been employed by me in preparing machines for the use of the society, and with whom I have advanced pretty far in an agreement, but without having reduced it to a definitive form. He pretends to a knowledge of the fabrication of most of the most valuable machines now in use in the cotton manufactory, and his execution hitherto, so far as he has gone, confirms his pretensions. Among other machines he has prepared a Double Loom, to be worked by one person. Of this he gives himself as the inventor, and has applied for a patent, which he will probably obtain. It is certain that the machine, if in use at all in Europe, is quite new; and, as far as without seeing it worked it can be judged of, promises to answer the expectation it gives. With Geo. Parkinson as Foreman or Master of a room in the Cotton Mill. This appears to be an ingenious mechanic who has obtained a patent for a Flax Mill, which he alleges his having improved. How far these improvements may be of real utility, or the Mill itself capable of answering its end, ought to be considered uncertain, since it is a question whether the spinning of flax by mills, which has been for same time a desideratum in Great Britain, is practicable. The object of engaging this man was to secure to the society an ingenious mechanic, and securing to them whatever advantages there might be in the patent.

All the contracts leave to the society the power of dismissing at pleasure, if on experiment they find it their interest.

I thought it advisable, in the first instance, to secure persons of whose usefulness there was reason to entertain a favorable opinion, though upon terms which may appear high, that the business might be early put in motion.

It is a point understood between Mr. Mort and myself that, if desired by the society, he is to go to Europe and bring over workmen, at his own expense in the first instance, but with the assurance of reimbursement and indemnification. To engage such a person as Mr. Mort for this purpose appears to me a point of some consequence.

Gentlemen, I have the honor to be, with great consideration,

Your obedient servant,

A. HAMILTON.

To the Directors of the Society for Establishing Useful Manufactures.

On the 4th of July following, the Board held their first meeting at Paterson, when the committee reported that they had visited the Great Falls, in company with Gen. Schuyler, and found it practicable to convey the water to Acquackanonk; but on consulting with Col. Hamilton it was judged best to erect their works at the Great Falls, and for this purpose sufficient lands had been obtained. A resolution was accordingly adopted that measures be taken to bring the water "across the gap to station No. 14," and there erect a cotton mill, also buildings for carrying on calico-printing, with the requisite machinery, together with buildings to accommodate the workmen. The sum of $20,000 was appropriated for the canal, $15,000 for the cotton factory and machinery, $12,000 for the print works, and $5,000 for a weaving-shop and its equipment.

Those who have visited the spot will recollect that the river has a total descent of 75 feet within a quarter of a mile. A dam has been constructed of immense blocks of stone bolted together to their rocky bed by powerful clamps of iron. The water is thus diverted into an artificial channel constructed across a deep ravine and through the rocks, which barely permits its passage. From this point it is made to turn in succession three tiers of factories, after which it is once more discharged into the river, at the distance of scarcely half a mile from the point of leaving it. At the time of which we write, a slender dam, 200 yards higher up stream than the present, supplied its place, while the ravine was converted into a reservoir, out of which the current passed into what is now the middle race-way. Along this it was conveyed 150 yards to the society's factory (near the Oakman mill). The immediate neighborhood, then and long afterwards, consisted of a low swamp through which several rivulets pursued their devious courses. It is now the most populous portion of Paterson.

The cotton and weaving factory consisted of a stone building, 90 feet in length by 40 in width, and 4 stories in hight. The bleach and print works were situated half a mile distant, near the site of J. C. Benson's silk mill; adjoining these was a large green. Bleaching by chemical preparations had not then come into operation, although we find shortly afterward that the superintendent was authorized to employ "one Tesserandot" who professed to have made such a discovery. The bleach-house was a frame building, 78 feet long and 3 stories high.

We have been thus particular in entering upon the details respecting these works, as being the first of the kind west of the Hudson, and the second on the continent, as well as in justice to the memories of many connected with the enterprise. Some of these have left an abiding record on the pages of their country's history, and all deserve to be gratefully remembered by posterity. As manufacturers they failed. Means. public spirit, and determination—"the will to do, the soul to dare"—were theirs; but lacking the practical part, and being unsustained by their country through its supreme legislature, they were doomed to disappointment, though not until they had laid the foundations of a work which has already more than realized their expectations.

Indeed, before the factory was completed, the extravagant expenditures of the society's funds had made itself painfully felt, and numerous were the shifts resorted to for the purpose of replenishing the treasury. Some stockholders refused to pay up their instalments, and an amendment to the charter had to be obtained, compelling them to do so. Complaints were made that an influential officer, entrusted with large sums of money, had furnished no account of the same. Large appropriations had been made to build houses for workmen and lay and the town. In these circumstances the directors decided to make use of their lottery privileges, and arrangements were made to dispose of tickets for $40,000. After an abortive attempt the scheme was reduced to one-sixth a

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this amount. Among those whose names are mentioned as commissioners in the lottery, we find that of Governor Howell, then in office.

From one of the resolutions adopted by the Board, we find that the quarter-acre lot was then offered for sale at $88, or including a small stone house, $250. The workmen were offered long leases of both at a rent of $12.50 per annum.

At the next election, Nicholas Low was chosen Governor, and Elisha Boudinot Deputy-governor. Both continued closely identified with the society for many years, the latter as governor, from 1797 to 1813. A change in the subordinate officers being considered necessary, Peter Colt, then Comptroller of the State of Connecticut, was invited to undertake the principal oversight and manage the works "as if they were his own property;" Major L'Enfant remaining as engineer for some months longer. Mr. Colt entered upon his duties in February following, and continued in the society's service until adversity obliged them to succumb. He was dismissed in 1796, with a vote of thanks declaring that their failure "arose from causes not in his power, nor that of any other man to prevent." Mr. Colt removed to northern New York, and about 1814 returned to Paterson, where he resided until his death, in 1824.

The first cotton yarn spun in the State was produced in a plain wooden building which stood on the site of A. Prall & Co.'s new cotton factory, the machinery being driven by oxen. Yarn was made here during the summer of 1793. The main factory was completed and set going in the spring of the following year. It was fitted up with "four carders, four roving-billies, four stubbing-machines, twenty-five spinning-jennies, and sixty single looms." The bleach works went into operation shortly afterwards. The whole number of employees engaged was about 125. It is noteworthy that to procure a supply of mechanics one of the officers had to visit Europe, while the workhouses of New York had to be searched to find operatives for the cotton mill. "*Tantæ molis erat*," &c.

A number of enterprises received the attention of the Board, most of which have since been carried out by individual enterprise. The superintendent was directed to plant mulberry trees for the production of raw silk. George Parkinson was engaged to construct machines for spinning flax, hemp and wool. Outsiders also began to avail themselves of the water-power then furnished at nominal prices, and several applications were made for mill sites or rooms with power. John Campbell commenced the weaving of stockings, and John Richards that of different fabrics of cotton goods on hand looms. Thomas Marshall spun candle-wick and ginned cotton in partnership with the society.

Their affairs were in the meantime approaching a crisis. Among the adverse occurences was the loss of nearly $50,000, occasioned by the failure of parties to certain bills of exchange purchased by the company, to pay in England plain cloths for printing. Besides, war was raging in Europe, affording our merchants a lucrative business as carriers; consequently capital was more readily employed in that direction than in domestic manufacturing. The expense of transportation was enormous, the workmen mostly unacquainted with their duties, and disorderly at that. It need occasion no surprise, therefore, that in the Fall of 1795 the calico-printers were discharged, and that in July of the following year operations were entirely suspended. The society, however, did not become bankrupt, nor did it dissolve, although proposals to that effect were made. In a short time the population of Paterson, was reduced from 500 to 43 persons.

[To be continued.]

THE EFFECTS OF SMOKING IN FRANCE.

The remarkable research made by M. Bouisson upon the danger of smoking has attracted the notice of the Academy of Sciences in Paris, and has been rewarded with high praise. The horrors hitherto unknown, or unacknowledged, with which smokers are threatened, nay more, convicted by M. Bouisson, are sufficient upon bare anticipation to ruin the revenue and the pipe-makers also. Cancer in the mouth M. Bouisson declares to have grown so frequent from the use of tobacco that it now forms one of the most dreaded diseases in the hospitals; and at Montpelier, where M. Bouisson resides, the operation of its extraction forms the principal practice of the surgeons there. In a short period of time, from 1845 to 1859, M. Bouisson himself performed sixty-eight operations for cancer in the lips, at the Hospital Saint Eloi. The writers on cancer previous to our day mention the rare occurrence of the disease in the lips, and it has therefore become evident that it must have increased of late years in proportion with the smoking of tobacco. M. Bouisson proves this fact by the relative increase in the French duties on tobacco, which, in 1812, brought an annual amount of twenty-five millions, and now give a revenue of one hundred and thirty millions; almost that attained by the duties on wines and spirits, and far beyond that rendered by those on sugar.

The use of tobacco rarely, however, produces lip cancer in youth. Almost all Bouisson's patients had passed the age of forty. In individuals of the humbler classes who smoke short pipes and tobacco of inferior quality, the disease is more frequent than with the rich, who smoke cigars or long pipes. It becomes evident, therefore, that it is owing more to the constant application of heat to the lips than to the inhaling of the nicotine, that the disease is generated. With the Orientals, who are careful to maintain the coolness of the mouthpiece by the transmission of the smoke through perfumed water, the disease is unknown. M. Bouisson, whose earnestness in the cause does him the utmost credit, advises a general crusade to be preached by the doctors of every country against the immoderate use of tobacco, as being the only means of exterminating the habit.

TRAVELING FAST AND SLOW OVER BRIDGES.

MESSRS. EDITORS:—On page 222 of the present volume of the SCIENTIFIC AMERICAN, in reference to the stability of bridges under trains moving at different rates of speed, a correspondent assumes the position that the higher the speed the more safe the train. To illustrate his views, he compares a thin sheet of ice on a pond to a bridge; but I hold this to be a defective comparison, inapplicable to the conditions of the case. Ice is, to a certain extent, elastic, and is supported by the water over its whole extent; a bridge, on the other hand, is a solid structure, supporting itself from abutments. A sheet of ice 100 feet long, placed on abutments like a bridge, would tumble to pieces from its own weight. As the water supports fields of ice, there is a necessity for moving rapidly over it (when the sheet is thin) before the inertia of the water is overcome. This is the whole secret of safety in moving with a high velocity over a field of thin ice, and also over some bridges. If the rails on a bridge were allowed a springing action sufficient to compensate for the concussion, so that the places of support might not receive sudden shocks, it would be a safe structure to travel over at almost any rate of speed; while the reverse would be the case with a bridge of solidity, possessing no elasticity, and the parts of which were devoid of cohesion. Supposing a bridge was erected on pillars of sand, and a railroad train set gently, and perfectly balanced, upon it, the train would be supported with perfect safety while standing still. But if we take the same train and run it on to such a bridge at the speed of only a few miles per hour, the whole structure will topple down, span after span, like pins struck down by a rolling ball.

In passing over bridges, different kinds of motion have different effects upon the structure, and the same fabric that is adapted for rolling motion is not suitable for vibrating motion. A bridge which may be allowed to spring to permit a railroad train to pass over it in perfect safety, would tumble to pieces by an elephant running over it. The multiplied vibrations of the steps of the animal accumulate and concentrate to tear the structure to pieces; the rolling motion of the train, on the other hand, distributes the force and prevents their concentration.

It may be taken as a perfectly safe rule that a bridge which cannot stand under the weight of a train at rest, can under no circumstances bear a train when in motion. Railroad bridges should be of sufficient strength to sustain a load five times greater than that of any train which may pass over them; and if they are composed of wood, they should be renewed every five years. Were it practicable for trains to run on rails having a springing motion to compensate for concussions, such rails might be laid on a solid bridge and trains run over it at any velocity whatever with safety. T. S.

Philadelphia, Pa., Oct. 24, 1859.

COAL AND HEALTH.

During the season of summer, when the atmosphere is warm and balmy, the cheerful breezes have free scope to dance through all our apartments, and ventilation is effected upon natural and conclusive principles. The time, however, is at hand, with the approach of cold weather, when doors and windows must be closed to shut out the piercing wind, and when fires must be maintained in all dwellings to heat our sensitive frames. This is the season when means should be adopted for securing the requisite amount of the pure air of heaven, under all the circumstances of artificial heating, in every dwelling—public and private.

The importance of ventilation is generally recognized, as the evils that have been caused by dwelling in ill ventilated apartments have been set forth in various publications. There are some facts, however, connected with this question, which are not so well understood. Thus, many persons mistake warm for impure air; hence they do not make a distinction between the two, and do not seem satisfied that a room is habitable until they have expelled all the warm air from it. There can be no question, we believe, about the salubrity of warm dwellings in cold weather, if the air in them is only maintained in a pure condition. The circulation of air in a room is dependent upon the heat which is generated in fires, grates, stoves or heaters. The hot air expands, rises and seeks vent, and the cold air rushes in to supply its place. The grand secret of good ventilation, therefore, is a plentiful supply of fuel—an important fact too generally overlooked. The houses of the poor are kept close and ill-conditioned in cold weather, because the inmates cannot provide sufficient fuel for their wants. Coal is as much an article of life and health, in the winter season, as food, and yet how few think of this! In those churches, schools and other public buildings, where fuel is saved at the expense of an inefficient supply of fresh air, a cent-wise and dollar-foolish economy prevails; and this is the principle idea we wish to impress upon the public mind at this time. Arrangements for ventilation may be made in endless variety; but without an abundant supply of fuel, neither comfort nor proper ventilation will be secured. Fuel is to ventilation, in cold weather, what steam is to an engine—its governing power.

REMOVING MILDEW FROM CLOTHES.

When clothes are rolled up in a damp state for a few days, they become spotted with mildew, consisting of minute *fungi*. These are very difficult to remove, and they injure both the texture and color of the clothes. The only effectual method known to us for removing such spots from linen is by steeping the latter in a weak liquor of chloride of lime. It is made by obtaining some chloride of lime from the druggist's (say one pound), then stirring it into about four gallons of cold water. It is now allowed to settle for one hour and the clear liquor is ready for the clothes, which should be steeped in it for about two hours, then washed thoroughly in cold water, and exposed on the grass to the sun.

We have had several inquiries regarding the best method of removing mildew from clothes, and perhaps some of our lady readers (of which we have quite a respectable number) may be able to give us a more efficient and simple method than the one we have described. Much fine linen is often laid aside from use on account of becoming mildewed and discolored. A renovating remedy for this evil would be a great favor to many persons.

INDIA-RUBBER SOLVENT.

MESSRS. EDITORS.—I was somewhat amused by reading an article on the above-named subject, in your paper of Oct. 8th. Mr. S. W. Ells cannot be posted, though he would have been if he had had my experience, which is this:—About 12 years ago I undertook to dissolve some india-rubber in some turpentine, and succeeded very well. The rubber which I tried was a pair of old-fashioned overshoes, and I pretty effectually spoiled them by reducing them to a liquid form. My next operation was to daub the solution with a brush over a pair of fine calf boots, and the consequence was I spoiled them also; for it took them so long to dry, that the dust collected on them and could not be removed. To pay me for my trouble, I received a "most glorious thrashing" from my father, and thus ended my experiments in the india-rubber line. J. T. MIDDLETON.

Chicago, Ill., Oct. 18, 1859.

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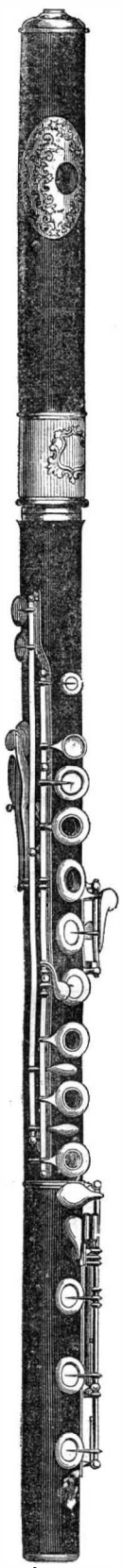
INDIA-RUBBER FLUTES.

Of all the materials for making flutes, neither ebony, nor cocoa-wood, nor glass, nor silver, nor gold, nor box-wood, nor any other known substance is equal to vulcanized india-rubber. Messrs. A. G. Badger & Co., the American manufacturers of the world-renowned Bœhm flute, after repeated experiments and the test of several years' use, have decided to adopt india-rubber as the principal material in their extensive manufactory. In speaking of it they use the following language:—



"All the tones are produced with the greatest ease throughout the entire register, in perfect tune, and with a tone remarkably sweet, brilliant and powerful. The first attempt to use Goodyear's patent vulcanized india-rubber was made about eight years ago. We then made four experimental flutes for Mr. Goodyear; one, an ordinary eight-keyed flute, and three of Bœhm's invention. One of these latter Mr. Goodyear presented to a resident professor of Brooklyn, N. Y., who still uses it, and the remainder were exhibited at the World's Fair, in London, and at the Paris Exposition, receiving premiums in both cases. But at that time, owing to the uncertainty of making the india-rubber of sufficient beauty and solidity, we declined adopting it as a leading material; but within the last few years so great improvements have been made that it is rendered beautifully black, it receives a polish as elegant as that of the finest enamel, will not split or break, is in every way entirely impervious to moisture, and is unaffected by all changes of heat or cold. We have, at great cost, procured from the patentee of Goodyear's hard rubber, the exclusive right to use this material in the construction of the Bœhm flute. We have done this after a series of experiments made by various first-class professors and amateurs of the flute, for the purpose of testing its tone-producing qualities, which experiments have resulted in a conviction of its superiority over the cocoa-wood, in making the straight-bore Bœhm flute. In nine cases out of ten, the cocoa-wood Bœhm flute will split; and when there is so much labor expended as there must be in the Bœhm flute, it is of the greatest importance that it should be made of a material not liable to such a contingency."

The Bœhm flute was invented in Europe in 1832, and is said to have there almost entirely superseded the ordinary flute. Its essential peculiarity is the use of keys for stopping all the holes. We give an illustration of one of these famous instruments made of india-rubber by A. G. Badger & Co., No. 181 Broadway, New York, who will be pleased to answer all enquiries which may be addressed to them in relation to it, and who can furnish instruments at all prices up to $500.

THE MANUFACTURE OF AXES.

[Concluded from page 267.]

THE CUTTING-UP.

As often as the operation is needed, the workmen are accustomed to devote one or more days to the "cutting-up" of a quantity of "stock" into "patterns," a pattern being the proper portion of iron or steel for one ax. In making the steel patterns, the ends of a number of bars are kept "heating" by the helper, care being taken not to burn the steel by overheating it. The foreman pulls out a bar, and, after the helper has slightly curved the heated end with a stroke of the sledge, places the heated end on the "hardy," which is gaged to the length of a pattern, and holds a cold chisel upon it, directly over the cutting-edge below, the helper striking it off with two or three smart blows. This cutting is sometimes done by machinery. The foreman then seizes the red-hot bit of steel in a pair of short-lipped tongs, prepared for the purpose, and, either with the aid of peculiar swedges at the trip-hammer or by means of a tool called a "set," which is struck by the helper, "chamfers" or "scarfs down"—or, in untechnical language, sharpens down—the side which has been curved inward, to a blunt edge; and a few blows on the ends and faces, to make it shapely, finish the steel pattern. It is then thrown upon the heap, ready to be used when wanted.

The bars of iron are marked off into oblong sections, about 8¼ inches in length. They are cut a little at the division lines with a cold chisel, generally on both sides of the bar, and are broken off, one by one, by a few sturdy blows of the sledge. The iron is sometimes cut up, as a lady would clip off the ends of a piece of tape, by means of a pair of terrible shears worked by machinery, one blow sufficing for each. The patterns are then piled away for future use. They will weigh from four to five pounds, according to the intended weight of the finished ax. A "single portion" of steel, which is the common allowance for one ax, weighs about a pound; "double portions," which are generally preferred by good choppers, because they believe that the extra amount of steel surface makes an ax "slip into the wood" easier, weigh from one and a half to two pounds—usually the latter. Great choppers, however, sometimes order enormous axes, weighing not unfrequently ten pounds (five being the average!), and containing three pounds of steel. They tell amazing stories of the achievements of great choppers, who pretend to "chop, split and cord" from four to six cords of hard wood in a day!

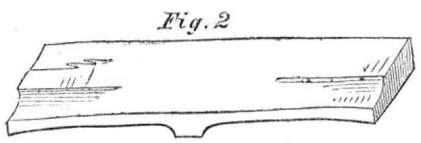
THE PLATING-OUT.

The foreman takes as many "ax-patterns" as he intends to work up, and marks a space about an inch wide across the center of each, which portion of the pattern is afterwards to be the "head" of the ax. Then two or three are thrust into the cast-iron cavern, from which the flames are bursting with all imaginable fury; and when one is sufficiently heated (which means almost melting), it is taken by the foreman to the trip-hammer, and shortly comes back in a shape resembling this figure:

Fig. 1

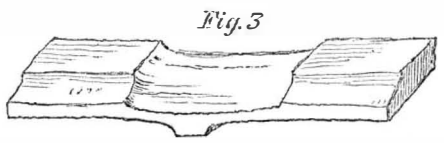
After another "heat" and another excursion, it has assumed this shape:

Fig. 2



With a little hammering, by the foreman and helper, at the anvil, the pattern is "plated out,"

Fig. 3



and is then ready for

THE WELDING-UP.

The pattern is heated and "doubled-over" by hand, in which stage it represents this figure. Gleams of intelligence now begin to appear in the face of the reader. He now sees that the two ends of the pattern are to be welded together, and will form the solid part of the ax between the eye and the steel bit. Before these ends are brought quite together, a bit of iron is thrust between, to be welded into the mass, and make the ax "full under the eye," an effect which could not be produced with iron of the thickness before-mentioned, unless this piece of iron were added. It is called the "throat-piece," "slug," or "Dutchman." The ax now begins to be called a "poll," which term ever after clings to the iron part of it. Sometimes many of the patterns are brought to the shape above described before any are "welded up;" and, indeed, it is usually the system to bring many at once, of the embryo axes, through each successive stage of the manufacture. In "welding up the poll," the iron mass, after being plentifully strewn with borax, is first brought to "welding-heat," in which state the metal is white and ready to melt; and then taken to a trip-hammer, which has been fitted with another set of swedges, and soon (after having been also hammered a little by hand) exhibits a shape like Fig. 5.

Fig. 4.

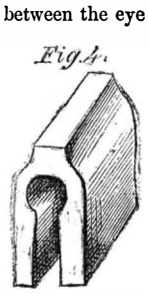
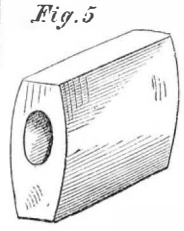


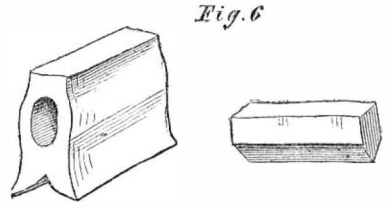
Fig. 5



PUTTING IN THE STEEL.

The end of the poll opposite the head is then heated (or "he't," as the workmen say), and split down through the center with a cold chisel to the depth of three-quarters of an inch or more. The two "lips" of the divided iron are then "chamfered down," or brought to a blunt edge, with a "set," and the poll is ready for the steel.

Fig. 6



The steel is fastened lightly in its place by hammering down the "lips" upon it; a spoonful of borax is poured along the "seam," and the whole is once more thrust into the fire. Much care must now be exercised by the helper, that he may "get a good heat" without "burning" the steel. Careless workmen spoil many axes in this stage of the manufacture, either by burning the steel or heating so badly that a perfect union of the iron and steel cannot be effected. At the proper moment, found only after repeated examinations, which get more and more frequent as the heating progresses, the foreman (who, for the last few moments, has himself attended to the heating) again hurries to the trip-hammer with the glowing mass, which is soon, with still another set of swedges, all welded thoroughly, iron to steel, and comes back a rough semblance of an ax.

Two or three more heats are taken. The helper "draws down the bit" to something like an edge, with rapid, light blows of the sledge, assisted by the foreman, who holds the ax upon the anvil, and constantly guides the blows of his fellow by blows of his own; the head is "hammered off" with frequent use of the "eye-pin" or "wedge;" the bit is once more re-touched by the foreman, who gives the ax a general inspection and "straightens" it, and then it is ready for the temperer.

JUMPING AND UPSETTING.

Choppers, farmers, and others who use axes a good deal, if they live in the neighborhood of a factory, are in the habit of saving the expense of a new ax by taking the "poll" of the old one, of which the steel is used up, to be "jumped" or "upset." The first of these operations consists of heating an old poll as though it were a new one, and putting a new steel into it in the way described for new axes. "Upsetting" consists of re-heating a half-worn ax, and "drawing down" the steel, or otherwise making it available for renewed use.

TEMPERING.

Experience and great care are indispensable in "tempering." If the temper is left too "high" or too "low," if the steel is overheated ("overhe't"), or plunged into the "pickle" at the wrong time, the ax is ruined. The process is briefly this: The steel and whole bit of the ax are brought to a red-heat, and plunged into cold water, or a composition or pickle, various recipes for which are cherished as valuable secrets. This leaves the temper extremely high; and steel, in this state, is frequently hard enough to scratch glass, and almost as brittle as that material. It is necessary to "draw" the temper thus obtained, that the cutting-edge may have the toughness requisite to enable it to "stand" the strain to which it is subjected in chopping. The steel is therefore held over a dull fire of coals, the varying degrees of hardness being indicated by the changes in the colors which spring to the surface of it. These changes are very curious, and, if suffered to exhaust themselves, seem to follow the order of the colors in the solar spectrum, though commencing at neither extreme. First is ob-

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served a light straw-color; next, gradually deeper shades of that color; then pink, or a reddish-yellow tint, is observed, which deepens, and at last becomes violet. Blue follows, and indicates the lowest degree of hardness—next above no temper at all. The temper for axes is arrested in the deeper shades of reddish-yellow (sometimes not till blue appears), by plunging once more into cold water.

GRINDING, STAMPING AND FINISHING.

From the tempering-room, the axes are taken to the "grinding-room." The grindstones used for axes, when new, are from four to eight feet in diameter, and from six to twelve inches in thickness, weighing from 2,000 to 4,000 pounds. They are made to revolve with great velocity, and sometimes burst with the violent motion, endangering the lives of the workmen and all who happen to be in the neighborhood. The "grinder" seats himself on a "horse" or lever, the rear end of which is fastened, so as to allow of a free movement of the other end. Between the forward end of the lever and the stone, he holds the ax (in front of him as he sits), by means of a stick passed through the "eye," and grasped in both hands. He is thus enabled to exert great pressure on the ax, the rough portions of which are rapidly worn away by the revolving stone; while the position of the point of contact is constantly shifted by a skillful combination of three "motions." The shape of the ax, the slope of the sides, the angle of the cutting-edge, &c., &c., are all determined by the eye of the workman, who learns, by long practice, to be independent of any pattern or formal direction. Sometimes the axes are partially ground, or "rough ground," before being tempered—a plan which, as the steel part is then much softer than afterwards, saves time and labor if it happens tht the stone is not "sharp-gritted," and does not "take hold" well.

The axes are now "stamped" with the maker's name and address, by means of one or more hardened steel "stamps," which are small oblong tools, upon one end of which are raised letters reversed, a smart blow from a sledge being sufficient to imprint them on even cold iron.

After stamping, which operation is performed by two men, the axes go to the "finisher" or "polisher," who, with a number of "emery-wheels," from 18 to 24 inches in diameter, coated with emery of various degrees of fineness, and which revolve with extreme rapidity, gives the bit of the ax (and sometimes the head, also) a high polish. The wheels are made of wood, coated with leather, and the emery is fastened to the surface with glue. The best polishing requires at least three, and generally four, wheels. When the head of the ax is not polished, it is "painted" with a composition formed by boiling asphaltum or other pigment in turpentine, and which dries rapidly. To do this neatly requires considerable dexterity.

After the axes have undergone an inspection, they are placed in boxes containing one dozen, and are then ready for shipment.

PUMPING-ENGINES.

There are various cities in this country supplied with water pumped from lower to higher elevations, and from thence distributed by gravitation. This is the best, in fact, the only sensible practical mode of supplying some cities with water. The engines employed for pumping are of large dimensions, and the Cornish single-acting is held to be the best, and has been generally adopted. While we have imported the Cornish engine as the best known for pumping purposes on a large scale, efforts have been made in England to supersede it, and other engines, of a totally different character, have been lately tried. At a meeting of the British Institution of Mechanical Engineers, London, a paper (since published in Newton's *Journal of Arts*) has been read, on a new pumping-engine erected near Newcastle-on-Tyne, for supplying that and other places with water, the substance of which paper we here give as a matter of much interest on account of the new and useful information it contains.

The paper referred to was read by Mr. Robert Morrison, the builder of the engine. The water-works are situated about two miles west of Newcastle-on-Tyne, where extensive filter-beds and a very large basin for pure water have been recently constructed. About ten miles distant from this there are eight very large collecting reservoirs, containing at ordinary level 600,000,000 gallons of water. The average low water level of these reservoirs is 360 feet above the high water-line in the Tyne, and the water is conducted into the towns of Newcastle and Gateshead through a 24-inch cast-iron main, by gravitation. Owing to the extension of these towns up the bank of the Tyne, considerable portions of them are above the level to which the water will flow direct. To supply these districts, an engine and reservoir were constructed some years ago, which afterwards proved insufficient, through the increased demand for water. The engine now erected can, at all times, supply the highest districts by gravitation alone, with an unlimited supply of water.

Down the bank, at about the level of high water in the Tyne, runs the 24-inch Welton main, from which a 10-inch branch has been led up the hill-side a distance of 2,240 feet to the filter-beds already mentioned, which are placed at a level of 246 feet above the high water line in the Tyne. The water passing from the beds to the pure water basin, is conducted to the engine suction-pipe, and is driven through another 10-inch main, 3,850 feet long, into a second recently-formed reservoir at the top of the bank at High Benwell, 412 feet above high water in the Tyne, from which the town is supplied through a 10-inch main. When it is not required to pass the water through the filtering-beds or pure water-basin, the 10-inch branch from the Welton main delivers the water direct into a well 20 feet deep, whence it is pumped by the engine, as before, to the second reservoir up the hill. The hight from the bottom of the well to the end of the delivery pipe reservoir is 182 feet, which is the hight the engine has been lifting during the experiments; for the depth of water in the well has generally been about equal to the depth of water in the high reservoir.

The pumping engine, which was erected twelve months ago, is a horizontal high-pressure expansive and non-condensing engine, working direct a double-acting pump, and coupled to a crank and fly-wheel.

The steam cylinder is 26 inches diameter and four stroke; and the pump, which is worked from the same piston-rod, is 11½ inches diameter. A cross-head is keyed upon the piston-rod, and guided by a cylindrical slide on each side, working on round guide-rods, carried by brackets from the bed-plate. The connecting-rod is coupled to the cross-head, close to the piston-rod, which is lengthened sufficiently to allow the crank to clear the end of the pump. The cross-head is made solid, in one piece, with the cylindrical guide on the side to which the connecting-rod is attached, and the other side is made with a socket and keyed. The fly-wheel is 16 feet diameter and 5½ tuns weight. The pump is double-acting, and has a solid piston, fitted with cupped leathers facing both ways, with a brass piece between them, to preserve the leathers from being cut. The pump valves are rectangular butterfly valves, of india-rubber, 1¼ inch thick, beating on ½-inch bars, with 1-inch spaces; the total area of opening in each valve seat is 112 square inches. The suction valves open from a chamber in the bed-plate to which the suction pipe leads from the well; and a back flap-valve of india-rubber is fixed at the extremity of the suction pipe, at the bottom of the well, 20 feet below the pump suction valves. The delivery valves are exactly similar to the suction valves and immediately over them, and they are connected by a horizontal pipe parallel to the pump, from which the delivery pipe leads off, proceeding direct to the main. A branch is carried off obliquely from the main to the air vessel, which is situated outside the building, and is 3 feet diameter and 12 feet high. Two small air vessels are also fixed on the top of the pump, immediately over the two delivery valves.

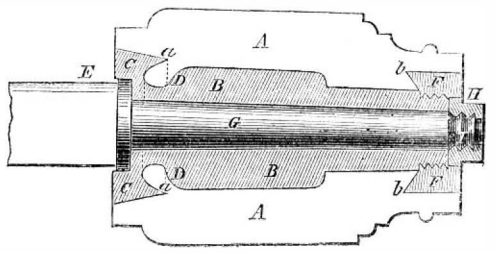
The steam cylinder is fitted with a separated expansion slide, working on the back of the ordinary slide valve. Both slides are worked by fixed eccentrics, but the expansion is made variable by means of a slotted link, vibrating on a center fixed to the bed-plate, and permanently connected to the rod of the expansion slide, which is attached to the center of the link; the eccentric rod being connected to a sliding block, worked up and down the slot by means of a screw, which can be readily adjusted whilst the engine is at work. There is an index on the side of the link to show the degree of cut-off. The exhaust steam is discharged into a cistern cast in the foundation plate, into which the cold feed-water is injected through a perforated pipe; by this means the feed-water is heated and then pumped from the cistern into the boiler. A glass gage on the side of the cistern indicates the level of the water, as it is desirable that there should not be more than three inches depth in the cistern.

As the eccentrics are fixtures on the fly-wheel shaft, and the rods permanently connected to the slide valves, for the sake of simplicity and durability of construction, a special arrangement is provided for starting the engine, by means of a two-way cock, attached to the bottom of the steam chest and connected by small branch pipes to both steam ports, by which the steam can be turned into either port beyond the valve, and the engine readily started. There are three Cornish boilers with single flues, having the fire in the flue; the boilers are twenty-eight feet long and four feet nine inches diameter, and the flues three feet diameter; but only two boilers at a time are used for working the engine. The fire-doors are arranged to admit any quantity of air, and regulated in such a manner as to be under the control of the engineer; the result is perfect combustion and the entire absence of smoke.

The steam is maintained at 60 lbs. per square inch above the atmosphere, and the engine is usually worked with the steam cut off at one-fifth of the stroke. The main slide valve, having always exactly the same motion, whatever be the degree of expansion, the opening of the exhaust and the amount of compression are constant. The usual speed of the engine is 24 revolutions per minute, or 192 feet per minute speed of piston; but has been worked up to 40 revolutions, or 320 feet per minute of the piston. The pressure of water upon the pumps, as indicated by a pressure gage, is 80 lbs. per square inch when standing, and rises to a mean of about 95 lbs. per square inch whilst working, equivalent to 18.6 lbs. per square inch effective pressure on the steam piston, or 57 horse-power effective. Taking the coals consumed for three months, the consumption is 30 cwt. per day of twelve hours, including lighting fires, &c., or 5 lbs. of coal per effective horse-power per hour, and 4 lbs. per indicated horse-power per hour. The consumption of coals is not much more than if this engine had been a condensing one; whilst the first cost of the engine and building is much less.

IMPROVEMENT IN CARRIAGE HUBS.

After all the hundreds of contrivances for hubs of carriage wheels, we have here a combination invented by Jesse Pruett, of Aurora, Kane county, Ill., which is said to be superior to any hitherto known.



A vertical, longitudinal section is represented; A being the usual wooden hub, and B, a metallic box in which the axle, G, turns. The box, B, has upon its butt end an annular enlargement, C, which is made slightly tapering so as to fit tightly when driven into the hub. D, D, are feathers cast upon the block to prevent it from turning. The hub being bored as usual and recesses cut for the feathers, the bore is enlarged at the big end to two-thirds the size of the large end of the box, and to the depth of the flange. The box is then driven into the hub, and the feathers, having sharp ends, cut and curl the wood, causing it to fill completely the recess, *a*, between the feathers and the flange, C. The nut, F, which is provided with the flange, *b*, is then screwed upon the small end of the hub flush with its end, thus securing the box rigidly in its place. When the axle, G, is passed into the hub, it is secured by the nut, H, as usual; the annular collar, I, keeping out the dirt and dust.

The advantages claimed for this arrangement are more perfect and solid union between the box and the hub, resulting from the conical shape of the enlargement, C, and the mode in which the recess, *a a*, is filled with the curled wood; also the great facility with which the box may be tightened, in the event of its becoming loose, by simply turning the nut, F, without even taking off the wheel.

For further information the inventor may be addressed as above.

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THE NEW WATER-GAS PATENT.

The following is the specification of Professor J. Milton Sanders, of Cincinnati, issued on the 27th of July 1858, for making the new water-gas noticed in our columns two weeks ago, and regarding which some of our daily papers have been giving unreliable statements to the public:—

"To all whom it may concern: Be it known that I, J. Milton Sanders, of Cincinnati, Ohio, have invented a new and useful improvement in the manner of making illuminating gas; and I hereby declare that the following is a full, clear and exact description of the same, reference being had to the accompanying drawing, making a part of this specification, which drawing represents, in section, an apparatus by which the invention can be practically carried out.

"The nature of my invention consists in making an illuminating gas by passing the vapor of water and a hydro-carbon previously mixed into a retort containing carbon, and bringing said retort up to a high red heat, which produces the gas in question." [We omit the figure, as the apparatus is not claimed, and the invention is clearly explained, so as to be understood without it.]

"A vessel or boiler, made of sheet-iron or any other suitable metal or material, is used, and it may be furnished with two funnels, through which water and a hydro-carbon, such as coal-tar or spirits of turpentine, or benzole, may be passed or poured into said boiler. Heat is then applied to the boiler until the water vaporizes, and the mixed vapor of the water and hydro-carbon may be passed through the tube into the retort. It is not necessary that the hydro-carbon should be mixed with the water in the boiler, but it may be volatilized in a separate vessel; though I prefer the former process.

"The retort contains any form of carbon, such as charcoal, coke, anthracite coal; and the retort, with its contents, are brought up to a high red heat. The mixed vapors of water and hydro-carbon, in passing through and over the heated carbon, are decomposed—the water into its constituent gases. The carbon of the coal shares itself with the gases, converting the oxygen into carbonic oxyd, and the hydrogen into light carbureted hydrogen; at the same time, the hydro-carbon is decomposed, and a portion of its carbon converts the light carbureted (CH_2) into heavy carbureted hydrogen (CH) illuminating gas. There is likewise given out a trace of carbonic acid. I have said that any hydro-carbon will answer the purpose to mix with the water vapor; but I prefer those existing in large quantities in coal-tar, in consequence of their greater cheapness. If spirits of turpentine is used, then the following chemical equation will, according to my investigations, illustrate the re-actions: 20 HO + (C10 H8) + C38 = (C28 H28) + 20 CO.

"By investigating the above, it will be perceived that 20 atoms of water, 1 atom of spirits of turpentine, and 38 atoms of carbon, are involved in the re-action, producing 28 atoms of heavy carbureted hydrogen (CH) or illuminating gas, and 20 atoms of carbonic oxyd. The latter gas gives no illumination, but eliminates an intense heat, thereby causing the more intense ignition of the liberated carbon of the illuminating gas, and also rendering the illuminating gas the more valuable for culinary purposes, or for any purpose whereby heating by gas is required.

"The passing of water vapor over red-hot carbon has been done before by chemists, whereby they have obtained light carbureted hydrogen and carbonic oxyd, neither of which give any illumination. Some authors, however, say that they get the light carbureted hydrogen and carbonic acid; and therefore authors disagree in their statements of the results obtained from this process.

"I claim carrying the mixed vapors of water and a hydro-carbon, formed in the manner herein described, into a retort containing carbon at a high red heat, for the purpose of producing an illuminating gas.

"J. MILTON SANDERS."

The following is a letter of the patentee to the New York *Tribune*, of the 15th of October, on this topic:

"SIR:—In your issue of Saturday last, there is a communication relative to the cost and originality of my water-gas. I would, in reply to that article, simply say that the writer is in error. The late experiments in Wilmington, together with many decisive ones made elsewhere, have demonstrated beyond a doubt that, by the use of 25 pounds of rosin as a carbonizer, 1,000 cubic feet of gas can be produced, and which gives a brighter illumination than either rosin or coal-gas. By the use of a certain species of coal as a carbonizer, I have now reduced the cost of the gas to at least one-half that of the water-gas made from rosin. That the same results I have attained have been got in Europe is not true; for I have taken a course diametrically opposite those followed there, and therefore have reached entire success, while they have failed. It is simply absurd to assert that my process of producing water-gas has been accomplished in Europe; for, had that been the case, I certainly could not have obtained a patent in this country. My specification was six months before the Commissioner of Patents; and during that time the most rigid supervision was devoted to it. Had there been anything identical in it with any European patent, the able and experienced gentlemen who had the examination of the specification would certainly have discovered it. On the contrary, I have the written opinions of the ablest patent lawyers in this country, that my process for the production of the water-gas is entirely original, successful and invulnerable. In conclusion, I would state (in order to prevent further newspaper controversy) that the opportunity will soon be accorded the citizens of New York to witness the manufacture and illuminating qualities of the water-gas in the large way, when each person will have access to such facilities as will convince him that the water-gas can be made for considerable less than coal-gas, as it at present costs the New York, Philadelphia and Wilmington gas-works, and that it will give one-third more illumination.

"J. MILTON SANDERS."

The following is a letter from a correspondent, an able chemist, on this subject. It is partly in answer to our remarks on page 264. We present a review of the entire subject on another page:

"MESSRS. EDITORS:—Permit something to be said in your paper in defense of water-gas. If there is a particle of truth in the newspaper-stories of its cheapness and brilliancy, we ought to know it early, and assist in hurrying up the good time when we can turn night into day with little expense.

"Now the fact that the Patent Office has granted patents to both White and Sanders is pretty fair evidence that their processes are not substantially the same. If it be granted that White's process has proved a failure, is it a necessary *sequitur* that Sanders' should turn out the same? Both use the same materials—steam, charcoal and rosin, or bituminous coal; but they use them with this difference: White has his charcoal and steam in one retort, and his rosin or cannel coal in another; Sanders has all of these in one retort. White makes his water-gas and passes it into his retort, generating rosin or coal-gas; Sanders produces all the gases by the same fire, and in the same retort.

"Supposing all said in praise of Sanders' gas to be true, a chemist would reason thus: Sanders, by putting all his materials together, and under the action of the same heat, allows the elements to have play of affinity during the nascent state. Hydrogen, *as a gas*, will not unite with sulphur, phosphorus or carbon; but it is well known that hydrogen, at the point of divorce from other elements—at the point of change from the liquid or solid state to the gaseous—seizes upon the first two with avidity; and Sanders favors all the conditions of its seizing upon the carbon also. Sanders' gas is, then, by no means a mere mixture of water-gas and rosin or coal-gas—a dilution of real virtue, like our city milk; but it is a novel chemical formation. This theory may contain a fallacy or a flaw, but it certainly is not palpable.

"Facts are what are wanted—the results of actual trials; and here Sanders' gas is not without support. The gas was manufactured in Philadelphia on a large scale. Professor Mapes (not the Mapes connected with the "air-light" of the celebrated Rev. L. L. Hill) superintended the operations for several days, and gave an account of his observations in a printed report, which is favorable to the gas in every respect. Reckoning materials and labor, the professor tells us that the gas costs 37 cents per 1,000 feet, and is superior to the gas company's gas in its illuminating quality, in the ration of 53 to 47; and that, when some temporary inconveniences are removed, the gas will be produced still cheaper and better. I also have other evidence to the same point.

"I address you these things with the interest of a gas-consumer, and a lover of scientific and industrial progress; further than this interest, the subject is of no consequence to me. C. A.

"New York, Oct. 27, 1859."

NOTES ON FOREIGN INVENTIONS.

Starch Sugar.—The Abbe Moigno, of Paris, presents in *Cosmos* a statement in relation to the action of light, according to recent researches of Niepce de St. Victor. It is stated that if a solution of starch or dextrine is subjected to the action of solar light for a short period of time, it will be changed into glucose (grape sugar), the presence of which will be recognized by the ordinary reactions, and by its sweet taste.

Recovering Wool from Fabrics.—A patent has been taken out, in England, by R. Bell, for recovering wool from old worn-out clothes composed of cotton and wool, such as de-laines. The patentee takes muriate of manganese, such as is ordinarily obtained as a residuum in the manufacture of bleaching-powder; the rags to be treated are then steeped in a solution of this, which entirely decomposes the vegetable or cotton portions and leaves the woollen fibers uninjured. The liquor is then strained through a sieve that retains the wool, which is afterwards washed, dried, and may be used for shoddy or other purposes in making new goods out of old materials, just as new paper is made out of old rags.

Restoring Faded Scarlet Colors.—Next to deep indigo-blue, scarlet colors are perhaps the most expensive to produce on woollen fabrics, because cochineal, a very dear drug, is employed in the process. This color, although very showy, is very easily stained with iron rust, which makes it brown, or with an alkali, which changes it into a dingy crimson. To restore this color on fine woollen cloth, G. T. Bousfield, of London, has secured a patent for the following mixture:—Citric acid, 300 grains; carbonate of potash, 150 grains; water, 7,500 grains. The citric acid is to be dissolved separately in 4,500 grains of water, and the carbonate of potash in 3,000. The whole is then mixed together and applied with a sponge. A very dilute solution of the muriate of tin is a better mixture for this purpose than the citric acid and alkaline solution. After being applied, and the stain removed, the spot is washed with warm water. Red military coats and facings, which have become stained with iron rust from the musket, may be renewed in this manner.

Air-engines.—M. J. Laubereau, C. E., of Paris, has taken out a patent for a new air-engine. The machinery is arranged for producing the expansion and contraction of the air, and in causing the stroke of a piston to be effected by the expanded air, while the return of the piston is effected by the pressure of the atmosphere aided by a partial vacuum at the back of the piston. In this engine the air is heated in a cylinder by itself, like steam in a boiler, and the hot air is admitted to the working-cylinder, like steam in a high-pressure steam-engine. Cold water is employed at one end of the cylinder to produce a partial vacuum, and the heating-cylinder has a large pump for feeding the air to the working-cylinder. The water-cooling arrangement is a decided mis-improvement, but so far as it regards a separate heater, there is no disadvantage except an increase in the size of the engine, from that of the small hot air-engine now in use in this country.

Gas-burner.—A new gas-burner has lately been brought out by J. Court, gas-fitter, London, which has received several commendatory notices by our scientific cotemporaries on the other side of the water. The improvement consists in forming a chamber in the nib, and filling it with perforated material, such as wire gauze. This retards the progress of the gas, and causes it to become more highly heated before it is ignited, thereby causing it to inflame sooner, and thus prevent any passing off unconsumed. A great number of patents have been issued, and much attention has been devoted to improvements in gas-burners during the past two years

A NEW SLEEPING AGENT.—The *Abeille Medicale*, of Paris, gives the following sweet prescription for procuring sound sleep. It says:—"Put two or three pieces of sugar candy, of the size of a hazelnut, into your mouth, on going into bed, and before they are melted away, you will be asleep. The sleep caused by it is refreshing and invigorating, and not at all resembling that produced by any drug."

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FOOD AND ITS CONSTITUENTS.

The food best adapted for one man is not always the most suitable for another. In a recent number of *Blackwood's Magazine*, the following cases are given as exceptions to general rules regarding food:—

"In 1844 a French soldier was forced to quit the service because he could not overcome his violent repugnance and disgust towards animal food. Dr. Prout knew a person on whom mutton acted as poison. 'He could not eat mutton in any form. The peculiarity was supposed to be owing to caprice, but the mutton was repeatedly disguised, and given to him unknown, and uniformly with the same result of producing violent vomiting and diarrhœa. And from the severity of the effects, which were, in fact, those of a virulent poison, there can be little doubt that, if the use of mutton had been persisted in, it would soon have destroyed the life of the individual.' Dr. Pereira, who quotes this passage, adds: 'I know a gentleman who has repeatedly had an attack of indigestion after the use of roast mutton.' Some persons, it is known, cannot take coffee without vomiting; others are thrown into a general inflammation if they eat cherries or gooseberries. Hahn relates of himself that seven or eight strawberries would produce convulsions in him. Tissot says that he could never swallow sugar without vomiting. Many persons are unable to eat eggs; and cakes or puddings, having eggs in their composition, produce serious disturbances in such persons, if they are induced to eat them under false assurances."

These statements may be perfectly reliable, but they are exceptional cases; the following general information, by Dr. Lankester, of London, is of universal application:—

Flesh-producing food, like every organ in the human body, contains three out of the five known gaseous elements of nature, namely, oxygen, hydrogen and nitrogen, together with one only of the many solid elements of chemistry, namely, carbon, which may be said to be the only solid basis of all organisms, vegetable as well as animal (bones excepted, the basis of which is calcium or lime). Without these four elements of flesh-producing food—oxygen, hydrogen, nitrogen and carbon—no ingredients of food can be of use in building up the wasted parts of the body. The nutritive or flesh-forming ingredients, or proximate elements of food are called fibrin, albumen and casein; they contain the four elements just named in exactly the same proportions, and are found both in vegetable and in animal food. The nutritive value of food depends upon its richness in flesh-forming matter. An adult man, in vigor, wastes five ounces of dry flesh daily, and requres the same amount of flesh-formers in his food.

The flesh-formers of the vegetable world are most abundant in those plants which yield the most substantive food of man; such as wheat, oats, barley, rice, Indian corn, &c.; and leguminous plants, such as peas, beans and lentils, or pulse. Wheat is the most important of these yielders, although the pea and bean tribe are so highly nutritious that they, in fact, require, or at least ought to be mixed with other food, to prevent them from being too heavy or indigestible.

Flesh-formers are indispensable to the very existence of the body, which is now believed to waste so fast that every forty days we may be said to possess a new body. This is certainly fast living, compared with the slow ideas of the last generation of chemical physiologists, who estimated the time for such waste and renewal at seven years; but such is the modern idea, as we have stated, and perhaps the truth lies somewhere in the rather wide interval between forty days and seven years. But although flesh-forming food is thus indispensable, fuel-yielding food is no less indispensable, as the natural heat of the system is kept up by the latter, and not by the former.

Fuel-yielding or heat-giving food must consist essentially of three of the four elements of flesh-yielding food, namely, carbon, hydrogen and oxygen, the nitrogen not being essential to it as a heat-giver, though often still contained, to some extent, in heat-giving food; and indeed, neither is the oxygen of use as a heat-giver in the composition of the food, although it is essential as the evolver of heat when it combines, from the breathed air, with the elaborated heat-giving food of the blood, in the lungs, or burns that food as fuel, in so combining with its hydrogen and carbon or its hydrocarbonaceous forms, thus converting these into carbonic acid gas and watery vapor, which are sent up the windpipe by the expiratory act of breathing, and so expelled, like so much smoke from a furnace, through a locomotive funnel or a chimney.

The proximate elements or ingredients of heat-giving food are mainly starch, gum, sugar and fat, each of these containing more or less of the three elements of heat-giving food. Thus fat, sugar, gum and starch are of little or no use in building up the structure of the body, or in repairing its waste. The natural heat of the body is 98° Fah. This must be kept up by the heat-giving food—easy work for such food in tropical climes or in summer, but somewhat hard labor in the arctic regions, and in winter of the temperate climates.

Among heat-giving food are potatoes, carrots and other vegetables, rice, sugar, and the fat of animal food, the butter of milk, the oils of vegetables, &c.

Five ounces of flesh-formers, being the amount required to restore the daily waste of the body, are contained in the quantities given of each of the following vegetable substances:—

	lbs.	oz.		lbs.	oz.
Wheat flour	2	1	Potatoes	20	13
Barley meal	2	6	Carrots	31	4
Oatmeal	1	13	Parsnips	15	10
Maize	2	9	Turnips	17	13
Rye	2	3	Cabbage	10	6
Rice	4	13	Tea (dry)	1	11
Buckwheat	3	10	Coffee (dry)	2	1
Lentils	1	3	Cocoa (nibs)	3	2
Peas (dry)	1	5	Bread	3	13
Beans (dry)	1	5			

MAGNETISM APPLIED TO LOCOMOTIVE DRIVING-WHEELS.

As this subject has been very lately brought before the public through our columns, it will no doubt interest many of our readers to know what opinion the *London Engineer*—good authority—expresses on the subject. In the number of that paper of the 16th September, after describing Mr. Serrell's method (which has appeared in our columns) of applying electro-magnetism for giving greater adhesion to the wheels, it says: "A similar plan was proposed many years ago, and it may now attain to useful practical results." Again in the subsequent week, (Sept. 23d), it says:

"Certain speculations have appeared in America with reference to means for increasing the adhesion of locomotives. It is proposed to magnetise the tires of the driving wheels so as to increase their hold upon the rails. It has been stated that, assuming the adhesion to be thereby doubled, an engine of 20 tuns weight would be enabled to do the work of one weighing 40 tuns. A more complete *non sequitur* could hardly be found. The power of a locomotive depends upon two elements; one, the force with which its driving-wheels may be made to revolve; the other, the bite of these wheels upon the rails. Under ordinary circumstances, the necessary weight of boiler, frames and machinery required to generate and exert a steam tractive force, at the periphery of the driving-wheels of, say, three tuns, is nearly 30 tuns; while the weight necessary to obtain an effective adhesion of three tuns need hardly exceed 18 or 20 tuns. Most passenger-engines have but one half—sometimes a less proportion—of their weight employed in adhesion, the rest of the engine being carried upon bearing wheels merely, which in no way add to the power. In goods engines, in consequence of the much slower speed, the average pressure upon the piston throughout the stroke is greater, and the smaller driving-wheels employed afford more leverage for the exertion of the steam tractive power which is sometimes as much as five tuns. But the whole of the necessary weight of the engine—or the weight which, upon the ordinary modes of construction, is inevitable in supplying sufficient heating surface, water and steam-room, and sufficient strength of parts—the whole of which is brought into effective adhesion through coupled wheels, is sufficient to render all the steam-power available. The power of the engine is not, under ordinary circumstances, limited by its adhesion, which there is generally a surplus, but by its steam traction, or the power with which it may be able to turn its wheels, and all adhesion beyond what is requisite to render this steam traction available, produces no useful effect whatever. Upon the present construction of locomotives, it is doubtful if any signal advantages would result from means, however simple, for increasing the adhesion, although cases may occasionally arise where such an increase would be convenient. The ordinary adhesion is much greater than is generally supposed."

A COLUMN OF INTERESTING VARIETIES.

Wallace & Sons, of Ansonia, Conn., have invented and patented a little brass silver-plated clasp, for fastening the hoops of ladies' skirts to the supporting tape. They inform us that their mill for making these clasps, which is driven by a large water-power, is running constantly night and day, from midnight of Sunday till midnight of Saturday; that they use 1,000 pounds of brass and make more than a million of these clasps every 24 hours.....The largest bar of gold ever brought to this country was received recently by the American Exchange Bank, from California, by the steamship *Star of the West*. It weighed 2,227 ounces, was 12 inches long, 5½ inches deep, 4 inches wide, and worth $41,226.....The bricks used in constructing the beautiful block, called Trinity Building, just above Trinity Church, in Broadway, New York, were made in Wisconsin.....We are glad to know that the grasshoppers are to be destroyed in some way. The Port Hope (Canada) *Guide* says, they are falling a prey to a grub, very similar in appearance to the weevil. On examination they are found covered with these small but formidable enemies, the strength gradually departs from the joints of the strongest, and they die. It is said the grasshoppers may be seen in myriads, stark and stiff, in the fields, while those alive are so dull and inactive that they can do but little mischief to the green crops. Some farmers assert, with all sincerity, that the weevil, appearing too late to successfully attack the fall wheat, pounced upon the grasshoppers, then young and tender, and will destroy them instead of the grain. If this should prove to be the case, it will be one of the most extraordinary circumstances on record.....There have been found in England, in rocks which were deposited long before the creation of man, a frog's bones of such size, as to indicate clearly, that the animal when alive must have weighed from 800 to 1,500 pounds.....A little tool has been invented for threading a needle. It is made with two blades, which hold the needle with its eye opposite a little funnel-shaped opening, into which it is perfectly easy for a person of week sight to pass the thread, and the thread inevitably passes through the eye.....A penny was deposited in the corner-stone of a church at Jackson, Mich., last week, that had been taken from the corner-stone of a temple in Rome, built during the reign of the first Cæsar.....The Post-office Department has ordered 1,000,000 of the ruled self-sealing envelopes, such as were illustrated on page 96 of the present volume of the SCIENTIFIC AMERICAN.....We have just received a copy of the *Commercial Advertiser*, published at Honolulu, Sandwich Islands, and one its items says: "The *Yankee* ought to bring news from the seat of war to May 20th, and accounts of the first battle.....In England, from 1845 to 1857—both included—13 years, 7,312,287 children were born in wedlock, and 520,704 out of wedlock.....The assessors returns from 51 counties in Indiana, show an increase, this year, of 161,354 hogs over the aggregate of last year.....The hight of the highest mountains on the earth, would be represented on an 18-inch globe, by less than half the thickness of one of the leaves of this paper.....It is said that the great oyster bed in Long Island Sound originated in a schooner being sunk at the place in 1841, loaded with small oysters, which were being transplanted to a bed, where they were to be planted to grow for market.....The last perilous ascent of La Mountain proves conclusively that the elevated current in the atmosphere, flowing from West to East, is not to be relied upon.....The Emperor of Japan has ordered that the cities of Jeddo, Nagasaki, Simoda and Hakodadi shall be united by telegraph, and a line is being built from Jeddo to his summer residence. All the vessels in the imperial fleet are to be turned into steam propellors, and one of them, the *Niphon*, had already left on a voyage of discovery, manned by a native crew and engineers. An American having discovered a copper mine, was permitted to work it on promising to divide the proceeds with the government. .....The strength of iron has been found to be increased by being extended under a heavy strain when heated to about 500°. In one case, the original strength of a bar being 60 tuns, its strength after being stretched about six and a half per cent in length, was 72 tuns, making a total gain of 26-51 per cent in strength and length. .....There are upwards of 1,000 miles of railroads in construction in Spain.

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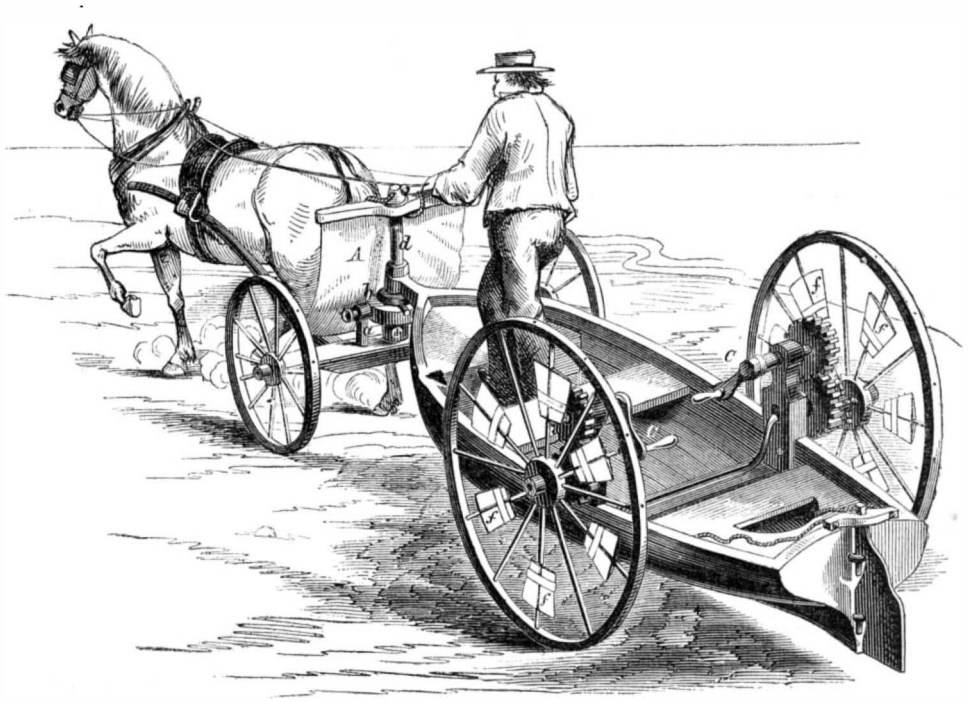
PERRY DAVIS' BUGGY BOAT.

Emigrants and others making long journeys through new and sparsely-populated regions, where few or no bridges have been built or ferries established, have often wished that their wagons were also boats in which they might quickly and easily cross the streams which offer so great obstructions to their course. Gentlemen also, visiting the seashore or any of our interior ponds, for the purpose of fishing, frequently find it convenient to take a boat along with them; but this has not been much practiced, a boat being so cumbrous a thing to transport. Repeated attempts have consequently been made to combine a wagon and a boat in one vehicle, but with indifferent success. We present now, however, an illustration of a combination contrived by Perry Davis, of Providence, R. I., which seems to be at once a comfortable buggy and a convenient boat.



DAVIS' IMPROVED BUGGY BOAT.

This boat is hung upon four wheels, one axle being just abaft the midships, and one at the extreme bow. The forward axle supports two standards, one of which, *a*, is shown. Through these standards the trunnions of the hoop, *b*, pass, thus permitting the hoop to maintain its level position when the thills are dropped and the axle rolled. A short cylinder, *c*, is dropped into the hoop, *b*, the cylinder having two pins, one on each side, which fall into notches on the upper side of the hoop and support the cylinder. An upright pin, *d*, firmly fastened to the bow of the boat, enters the cylinder, *c*, and thus connects the boat with the forward axle; a piece of india-rubber being interposed between the top of the cylinder and the shoulder of the pin, to serve as a spring. A leather screen, A, is hung in front of the board to serve as a dash-board.

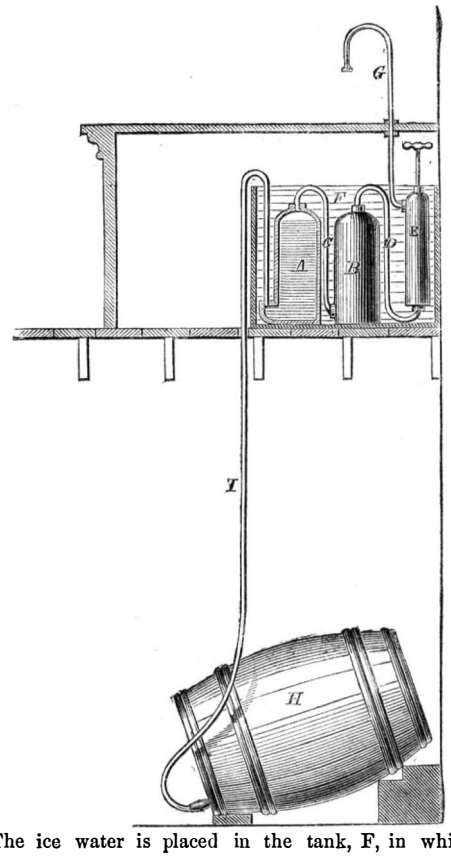
The boat is also hung upon the aft axle on india-rubber springs, and the wheels of this axle are provided with floats, *f*, which are attached to each alternate spoke of the wheels. They are made of two pieces of tapering wood, which are bound firmly together and to the spoke by driving bands of iron tightly upon them, the spokes being rounded where the floats are attached so as to allow the floats to be turned in the plane of the wheel when the boat is on land, and across the wheel, or at any other angle, when the boat is in the water. By turning the two cranks, C C, which are geared to the wheels, the boat may be propelled, as a steamboat is, without the use of oars. Provision is made for throwing the two pinions out of gear, when the boat is used on land. This is necessary for two purposes, to prevent the cranks from revolving and interfering with the persons in the boat, and to allow the boat to rest upon the spring above the axle, which it could not do if it was supported by the upper pinions. Where the axles of these pinions pass through the standards in which they turn, grooves are cut around the axle, into which the ends of two thumb-screws enter and hold the pinions in their places. When the boat is taken to land, these thumb-screws are removed and the pinions slipped inboard, out of gear.

Persons desiring further information in regard to this boat may address the inventor, Perry Davis, as above.

CLOSE OF THE AGRICULTURAL BUREAU OF THE PATENT OFFICE.—The present Commissioner of Patents having, as a member of Congress, been witness to a repugnance in influential quarters in that body to appropriate for the agricultural branch of the Office, has not submitted an estimate of appropriation for that object for the next fiscal year. It is understood that the Secretary of the Interior approves this step, determining to devolve the responsibility in the matter upon Congress. The members of that body who secretly desire reports on agriculture for their constituents, yet indulge in reflections upon governmental action in the premises, will be obliged to meet the question of continuance of appropriation fairly and squarely upon its merits, and be responsible for their votes to their several constituencies. It should be borne in mind that the determination of Congress upon the point relates to the next fiscal year, and not the present one; to reports for the session of 1860-61, and not for the coming one. For the latter, members will be furnished reports in value to the amount of $40,000, a sum less by one-third than what was asked for, a year since, by the Secretary of the Interior.—*Baltimore Sun.*

HALL'S REFRIGERATING APPARATUS.

The annexed cut represents an apparatus for cooling liquors, or Croton or other water used for drinking, so arranged as to be efficient and at the same time very easily cleansed; the pipes being inserted into the receivers in such a manner that they may be easily removed when it is desired to cleanse or renew any of the parts.



The ice water is placed in the tank, F, in which are the receivers, A and B, and the pump, E, all connected together by the bent pipes or siphons, C and D. The liquor to be drawn is in the barrel, H, from which the pipe, I, leads to the bottom of the receiver, A. As the liquor is drawn from the barrel by means of the pump, E, it passes through the receivers, A and B, the siphons, C and D, and the pump, E, all standing in the ice water; the liquor is thus exposed to a large cooling surface. The pipe, G, leads from the pump above the counter in the usual manner, for the discharge of ale or other draught liquor. The tubes, C and D, being bent in the form of siphons so as to enter at one end the top of the receivers; said end of the tube can be taken with great facility from the receiver when it is necessary for removal or repairs. The whole apparatus may be readily cleansed by inserting the pipe, I, into a vessel of clean water, and drawing the water through the pipes and receivers by means of the pump.

This refrigerator is the invention of Valentine Hall (deceased), of New York, and was patented Sept. 20, 1859. Further information in regard to the matter may be obtained by addressing C. H. Bailey, attorney for the executors, No. 9 Chambers street, this city.

INTERESTING PATENT CASE.

An important case, among the Pennsylvania coal companies, is now being tried before Hon. Judge Grier in Philadelphia. The parties are J. Battin against the Lehigh Coal Navigation Company, for infringing his patent on coal-breaking machinery. This patent was first issued in 1843, was extended two years ago, and has been several times before the courts. There can be no doubt but Battin first got up the machine which is now in general use for breaking coal; and it is stated that the owners of the mine had agreed to pay him one cent on every tun of broken coal. This would have brought him in the handsome sum of $30,000 annually on 3,000,000 tuns. The payment of this small amount by the coal companies is now refused. It is expected that the trial will be a long one, as the defendants will cover a wide field to defeat the claims of the patentee.

THE TELEGRAPH PROJECTS OF THE WORLD.—There is no discovery or invention which has come so immediately and extensively into use as that of the magnetic telegraph. Every government seems to feel the necessity for it; and even in Japan it has been adoped as a useful agent for the government. Very soon the whole globe will be covered with telegraph wires, and every part of it be brought into closer connection and closer interests. Russia has determined to establish a line from St. Peterburg across Siberia to the river Amoor, and thence to Russian America, which will be but a short distance from our Pacific States. This will probably be the first reliable connection which will be made between the two continents. A project is already on foot for submarine cables from India to Australia, to be laid by the united actions of the governments of England and Holland. The English home government and the East India government bind themselves to connect the India peninsula with the island of Singapore; the Dutch government agrees to carry out the connection to the southeast point of the island of Java, which belongs to Holland; and the Australian government will unite their continent to Java.

CURING CARBUNCLES.—A French paper prescribes a most simple remedy for those troublesome pests—carbuncles—with which some people are afflicted. This is Burgundy pitch applied on a linen cloth to the tumor.

A small light draft steamer has been launched at Nicolaefst by a company of Americans, for navigating the Amoor river, for the purpose of trading with the Russian tribes in the Amoor country.

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VOL. I., NO. 18.....[NEW SERIES.].....*Fifteenth Year.*

NEW YORK, SATURDAY, OCTOBER 29, 1859.

AIR-ENGINES.

IR in a compressed condition has been proposed as a general motive agent by some enthusiastic genius in Paris; and his project having been somewhat publicly discussed, several of our readers have made inquiries of us regarding its practicability. The plan suggested consists in erecting one or more powerful steam-engines in a convenient locality in a city, and compressing air in large and strong receivers for distribution by pipes through manufactories and printing-rooms, to work engines by compressed air instead of steam. The idea is certainly a grand one; the project is worthy of Brunel. Were it carried out, the numerous steam boilers scattered throughout a city like New York, in vaults and shops, with all their attendant dangers, would be dispensed with; and all the trouble involved to operate the engines for driving machinery in shops, would simply be the turning of faucets in the same manner as we are now supplied with water. This plan would be eminently desirable, on account of its conveniences, safety and cleanliness; but two questions meet us on the very threshold of inquiry, viz.: is it practicable? and if so, is it economical? We can operate machinery with electro-magnetism, hot air, gas, wind or water; but dollars and cents, in expenditure and profits, always rule in the selection of the power to be used.

In answer to the inquiry regarding the practical application of compressed air as a motive power, we would state that it is perfectly practical. On page 11, Vol. VI. of the SCIENTIFIC AMERICAN, there is a description of a compressed air-engine, used in a coal mine near Glasgow, Scotland, and with perfect success. The air is compressed at the mouth of the pit by a steam-engine, then forced down a vertical pipe 600 feet deep, then to the air-engine, a distance of half a mile. This engine was applied for winding purposes in a situation where a steam-engine would have been inadmissable, and it has now been in operation for nine years and has been found to answer the purpose completely. The air-engine in this case was once an old steam-engine, and the pressure with which the air is worked is 30 lbs. on the square inch. The heat developed during compression is carried off by a stream of water, so that the air, when exhausted from the engine, is cool and refreshing, and serves the purpose of ventilating the mine as well as operating the machinery. If this has been done successfully for nine years in a coal mine, it puts the question of practicability beyond a doubt; and the same results can be produced anywhere with similar apparatus. It has been objected to this system, that it could not be carried out in a city, on account of leakages in the pipes which convey the air; but do we not convey the gas for illuminating our houses through the streets in this manner without raising the objection of leakage to its use? and gas is certainly far more expensive than compressed air ever can be.

The loss of pressure in conveying the air a distance of half a mile is only one pound; the amount delivered from the steam-engine being 30 lbs. on the square inch, that at the engine, 29 lbs. The loss in this case is very small, owing to the pipes used being very smooth and the valves accurately fitted. Pipes with rough surfaces would never answer; they would absorb the power by the great amount of friction they would cause. This was the case with a compressed air-engine which had been put up in a powder-mill at Constantinople several years ago. The air was conveyed 300 yards to work the engine, but in that short distance almost the whole power was lost.

The other importan question in connection with this subject is that of economy—dollars and cents. Can compressed air be supplied as cheaply as steam for driving machinery? We cannot answer this in a very definite manner. The compressed air-engine we have described involves more expense than a steam-engine, and this perhaps would be the case under almost all circumstances, but more especially in reference to the pipes laid under ground, like those of gas and water in a city. On the other hand, some arguments may be presented in favor of such a system, even making considerable allowance for the leakage of air in the pipes and also the friction. Thus, the power to compress the air by a large engine can be more economically generated and applied than the steam from the numerous small boilers now required in the various shops. Safety from explosions and fires is a great consideration in its favor; but above all, its cleanliness and convenience.

WATER-GAS

On another page we have given the specification of Professor Sanders' patent for making water-gas; also a letter from him, and one from a correspondent on the subject. The views of the patentee and those of our correspondent do not seem to be based upon the invention as set forth in the patent. The process, as stated, consists in mixing water and coal-tar, or turpentine, &c., in a boiler, applying heat to it, and making the vapor so produced pass through the red hot charcoal in a retort. The gas thus obtained is that regarding which Professor Mapes has made such remarkable statements, according to our correspondent. The subject of water-gas is quite old, and White's method, patented Jan. 29, 1850—although somewhat different—appears to be superior to that of Sanders. In the use of coal-tar with water, to produce gas, a very small portion of hydro-carbon vapor can pass over by Sanders' method, and turpentine is too expensive to use. The process as described in the patent is almost impracticable for useful purposes, as the water and tar, or whatever may be used, should be first exposed in a retort in the method pursued by White. His plan consisted in using two retorts; water was admitted to one in small quantities by a siphon, and falling upon red hot charcoal, and scraps of iron, it was decomposed, some passed off as carbonic oxyd (CH), a portion as hydrogen, and some as steam. These products were then passed by a pipe into the other retort containing resin, and there united with the resinous gases, forming the hydro-carbon, or water-gas. Gas obtained from the destructive distillation of resin is a compound of olefiant and carbureted hydrogen ($C_2H^2+CH^2$) and is highly luminous. Gas obtained from the vapor of water passing through red hot charcoal is a carbonic oxyd and hydrogen (CO+H). According to Dr. Frankland, of Manchester, England, no portion of the hydrogen from water enters into chemical combination with carbon vapor in a retort. As neither carbonic oxyd nor hydrogen gas possesses illuminating power, of course we must consider that when these gases are mixed in any manner with illuminating gas, it is only for the purpose of dilution, not illumination. It is stated by Professor Sanders that he prefers to use coal-tar on account of its great cheapness; but if his invention is to supersede gas made from coal, as is contended by some, where can he get his coal-tar—this being the refuse of our coal gas-works? The Philadelphian correspondent of the *New York Tribune*, in the issue of the 19th inst., gives a very unreliable account of this water-gas, and the process by which it is made. He states that the patent rights for eight States have been sold by Dr. Sanders for $80,000, and that good gas can be supplied for 30 to 50 cents per 1,000 cubic feet. Such statements are calculated to deceive the people and do great injury.

There is a great amount of ignorance prevailing regarding gas for illuminating purposes, many supposing that equal quantities of every gas are of equal value, which is far from being the case. Gas made from solid hydro-carbons, such as coal and resin, is chiefly valuable according to the amount of olefiant gas which it contains. Resin is superior to coal gas in quality, just because it contains far more olifiant gas; and cannel coal makes more olefiant gas than common bituminous coal. The value of gases can only be determined by experiment, not by the inspection of a gas-burner. The quantity of olefiant gas present is ascertained by mixing chlorine with this gas in a dark place. The chlorine and oleffiant gases unite and form a yellow oily fluid consisting of one atom of chlorine and one of olefiant gas, the equivalents being 36 + 14 = 50. Hence fourteen-fiftieths of the product will be the weight of olefiant gas combined. It is probable that the amount of olefiant in the gas with which this city is supplied is not above 5 per cent, the remainder being carbureted hydrogen. The density of this gas is .981, and 100 cubic inches weigh 30.57 grains. This information, we believe, will be found very useful to many of our readers.

THE CURIOSITIES OF THE SUNBEAM.

Simple as a white ray of the sun's light appears, it is found, on close observation, to be composed of at least three distinct elements, and to possess many curious and wonderful properties. The three elements of which we speak, are light, heat and chemical force; and they may be separated from each other by means of a very simple instrument. Darken a room, and bore a small hole through one of the window-shutters, so as so admit a ray of light from the sun. Place a triangular prism of glass horizontally across the ray, with one edge down, so that the light may pass through it. The ray will be bent upward, and will strike the wall at a higher point than it did before the prism was interposed. It will not, however, all be bent equally, so as to make the round spot it did before, but will form an elongated image of seven brilliant and most delicate colors, which shade into each other and fade away indefinitely at the ends of the image. The lowest of these colors, when the prism is placed as directed, is always red; and the others, in order as we ascend, are orange, yellow, green, blue, indigo and violet. Suspend a delicate thermometer in each of the colored rays, and it will be found that the violet ray imparts the least heat, and that the heat increases as we pass down through the several colors. If we continue our observations with the thermometer down beyond the red ray, we find a point, where no light falls, where the thermometer receives more heat than it does anywhere within the light. The rays of light are separated by the prism from those of heat.

Another curious fact which has been observed also proves that the light and heat of the sunbeam are distinct elements. If we suspend a thermometer in the vicinity of a close stove, which emits heat but not light, the heat radiating from the stove will raise the mercury in the thermometer. But if we interpose a plate of transparent glass, none of these dark rays of heat pass through it; it is entirely opaque to them. If we now increase the temperature of the stove until it becomes red-hot, the rays of heat begin to pass through the glass and affect the thermometer; and if we raise the temperature to a white heat, the rays pass freely through the glass. If we vary the experiment, and use crystals of rock salt, instead of glass, we find that the dark rays of heat pass out as freely through the salt as do those which are accompanied with light.

Some of the alchemists discovered, centuries ago, that the chloride of silver, which is as white as snow, turns black on exposure to the light; and more recently it has been found that a large number of bodies are thus affected by light. It is this power of light which is used in the daguerreotype and photograph processes. By more than one means, the force of this element can be measured in the several parts of the spectrum, and it is found to be most powerful in the violet ray, and to extend entirely beyond the light. It is not visible to the eye; it does not affect the thermometer; and it is therefore neither light nor heat. It is easy, after thus dividing the sunbeam, to re-combine its parts, when the white ray will produce the several effects of light, of heat, and of chemical change, which are produced separately by its several elements.

PATENTS TO NEW YORK LADIES.—The laws of the State of New York provide that every married woman who obtains a patent for her own invention, pursuant to the laws of the United States, may hold and enjoy the same, and all the benefits, proceeds and profits thereof, to her own separate use, free and independent of her husband and his creditors. The statute also authorizes her to transfer and sell the patent, entirely "on her own hook." Come, ladies, wake up, and bring forward your inventions! Your fertile intellects should never be allowed to rust under liberal enactments like the above.

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THE TRIBUNE AND PERPETUAL MOTION.

On page 254 of the present volume of the SCIENTIFIC AMERICAN, we published an extract from the New York *Tribune*, in which its scientific reviewer of patents declared it was possible to construct a perpetual motion—an electrical machine, "self-generating, and furnishing a surplus of power. We pointed out the erroneous nature of such teachings relating to practical mechanism, and hoped our remarks would have convinced our cotemporary of his error; but no such good effect has been the result. Wounded in his vanity, he actually assumes, in the issue of the above paper of the 19th inst., the position that every water-wheel, steam-engine, windmill, and horse-power is a perpetual motion; and says "perpetual motion is the law and the principle, which is the same in all the domains of mechanical science—motion being the natural, and rest a mere relative condition." This may do for the "ma i ies" of the *Tribune;* but it will not do for men of science or sensible, practical mechanics. If such principles prevailed in practical mechanics, no expense would be incurred for driving machinery, except the power required to stop it when in motion. According to such conclusions, one of Hoe's lightning presses, when finished, should start off itself, and make the printed sheets fly off in thousands per hour forever. "Perpetual motion being the law and the principle in the domains of mechanical science," according to our cotemporary, such would be the natural results. This is not an abstract question, but one relating strictly to practical mechanics—the operation of machinery by water, steam or other engines. According to the position which the writer in the *Tribune* has assumed, a water-wheel can pump back, to the top of the fall, all the water required to drive it, and furnish a surplus of power beside. We are surprised that any person should have exhibited such a want of judgment and intelligence on this subject at the present day.

FAIR OF THE AMERICAN INSTITUTE

The appearance of the fair has been constantly improving since it first opened, from the introduction of new machines and other articles for exhibition. We continue to devote such space as we have to spare to notices of those things which we deem most interesting to our readers.

SHEARS AND SCISSORS.

Wendt & Seymore, of Elizabeth, N. J., and 52 Beekman-street, New York, manufacturers of shears and scissors, make a brilliantdisplay of their wares, in large variety of size and form, with gold and silver-plated, japanned, and polished handles. Their shears and scissors are made of malleable iron, with cast-steel edges. The rough castings of the blades, they obtain from the Elizabethport Malleable Iron Works, the edges are cut by machinery from sheet steel, and both being heated to the proper temperature and dusted with borax, are welded together by a drop, which performs the operation at a single blow. The economy of labor in using malleable iron for the handle, instead of the old process of forging with hammers, is, of course, enormous, and the drop for welding which has recently been introduced, and which is a perfect success, does the work of four men. The silver-plating is done by the galvanic process, and the shears which are japanned are subjected to a three hours baking to harden the japan. The finished article, in quality, form, and appearance does honor to American manufacturers.

James H. Roome, of New York, exhibits a pair of his patent tailors' shears. This is a modification of that variety of shears in which the lower handle is attached to the lower blade, in order that the lower blade and handle may slide along the table without being raised at all from it, the upper handle working on a fulcrum distinct from the fulcrum of the upper blade, the blade and handle being connected so that raising the upper handle, raises the upper blade, instead of lowering it, as in the ordinary shears. Mr. Roome so connects the blade with the handle as to change the fulcrum as the shears close, and increase the power of the handle-lever as the cutting-point approaches the end of the blade, thus rendering the strain upon the thumb less variable. Mr. Roome has secured his invention by two patents in this country, and by Letters Patent in Britain and France.

HARVESTERS.

The show of mowers and reapers is not very extensive, we noticed only three machines on the ground, namely, the combination mower of Aren Stoddard, of Busti, N. Y.; Mr. Wood, of Hoosick Falls, N. Y.; and Messrs. Adriance, No. 165 Greenwich-street, this city. Each machine has its peculiarities; these we have no room to describe at present, but we are pleased to state that in the materials employed, and the workmanship displayed, their is evidently a great improvement made in them all, over those which were generally manufactured a few years since. We have known some excellent inventions deeply injured in reputation from the use of poor materials, and the employment of deficient skill in the first machine which were construted. If an inventor desires to do justice to himself, he should be most careful in having all his machines well made.

ROTARY PUMPS AND FIRE-ENGINES.

Although rotary steam-engines appear to have had very indifferent success, it is otherwise with rotary pumps. At every fair within our recollection quite a number of these have been on exhibition, and they also make a considerable stir among the multitude on the present occasion. Andrews' centrifugal pump throws an apparently large body of water; being driven by two small oscilating steam-engines, the cylinders of which are set at right angles to one another. The other pump is Careys', which was illustrated in Volume III. of the SCIENTIFIC AMERICAN, and has been lately applied to the steam fire-engines of Lee & Larned. One of their engines, the "Manhattan," belonging to engine company No. 8. of this city, is at the fair, and is a beautiful light machine weighing only 5,200 pounds. It has thrown a verticle stream 208 feet high, out of a $1\frac{1}{8}$ inch nozzle. It was the only steam fire-engine that we saw at the firemen's great parade, held in this city on the 17th inst., where no less than 135 companies appeared in procession. We understand that steam fire-engines vary in price from $4,000 up to $9,000. Samuel & Akerman, No 200 Sixth avenue, this city, also exhibit a rotary engine and steam-pump, both stationary and portable. A very simple and apparently effective dymometer for measuring the power of engines, water-wheels, or any other motor, is exhibited by Mr. Neer, of Albany, N. Y. The power is conveyed to operate by a belt, a device, which presses upon a spring and compresses it according to the amount of power given out. This spring operates a register by which the amount of power may be read off at any moment. This dynamometer is constructed something like a spring governor, and if may be attached to the throttle valve of an engine.

SEWING-MACHINES.

No less than 27 of these are exhibited; the names of their manufacturers would form a large list. No class of machines has come so rapidly into use as sewing-machines. No less than 36,000 were manufactured during the year, ending the 1st of last July. The great reason why so many of these machines are manufactured, and always will be sought after, is their adaptedness for family use. Had they been made for huge factories, like power-looms, the never would have proved so beneficial for the public or the patentees. Let inventors of other machines take the hint; let them not forget to invent for the million, and not the select few. In the manufacture of sewing-machine, success depends upon the materials used, and the skill employed in their construction. This is also the case in the fabrication of any machine or article. Manufacturers who desire to secure a permanent business should devote unremitting attention to these points and principles.

INVISIBLE DOOR SPRING.

J. P. & E. Kenyon, of Williamsburgh, N. Y., exhibit a door which is self-closing by an invisible spring, connected through a groove to the top of the frame. It is a very neat device, and can be applied to any door for a few cents. The same exhibitor has also a balance steam and water faucet. Instead of allowing the steam or water to press on one spot of the valve and force it tightly in its seat, the pressure is divided into two opposite channels, so as to balance one another.

COOKING BY GAS.

For several years we took favorable occasions to direct attention to the convenience and cleanliness of gas for cooking and such purposes. Stoves, small and large, adapted for burning gas, are no longer curiosities in our city. Several kinds of them are on exhibition—both kitchen and parlor stoves—by S. T. McDougall, corner of Broadway and Canal-street, New York. A parlor gas grate is also shown. The fire-box is filled with asbestos, and through this the gas is distributed and gives out a great amount of heat and cheerful light.

WEEKLY SUMMARY OF INVENTIONS.

The following inventions are among the most useful improvements patented this week. For the claims to these inventions the reader is referred to the official list on another page.

HEM-FOLDER FOR SEWING-MACHINES.

L. Clark, of Monticello, N. Y., has a hem-folder, which possesses one marked advantage over all heretofore in the market; viz, it can be made to turn the hem under instead of over the cloth, and hence in sewing with machines which do not make the stitch the same on the back as on the front of the cloth, as for instance, the Grover & Baker machine, the best side of the stitch is brought to the face of the cloth and not on the wrong side as when it is turned over.

MACHINE FOR COVERING THE SEATS OF SADDLE-TREES.

The object of this invention is to facilitate and expedite the covering of the seats of saddle-trees—work which has hitherto been done manually, at an expenditure of time and labor that involved considerable expense, requiring skillful and tasty workmen, to perform even passibly good work. The invention consists in the use of an elastic bed or cushion in connection with a pressure lever, folding bars, and a clamp, whereby the desired end is obtained. This device is the invention of John MacClure, of Newark, N. J.

MACHINE FOR MANUFACTURING SHEET METAL CHAINS.

This invention relates to a machine for manufactnring sheet metal chains, for which Letters Patent were granted to the inventor, bearing date May 4, 1859. The object of the invention is to obtain a machine by which the whole work may be produced expeditiously and automatically, from stock consisting of metal plates of a requisite thickness previously prepared in any proper way. The inventor of this device is James Lancelott, of South Providence, R. I.

IMPROVED COTTON GIN.

This invention relates to an improvement in the roller gin, whereby the advantage attending the use of this kind of gin is obtained, to wit, the separating of the seed from the staple without injuring the latter, and at the same time a great speed is obtained, so that the work will be done very expeditiously, as well as in a perfect manner. The credit of this invention is due to Enoch Osgood, of Boston, Mass.

POLISHING-IRON.

This invention consists in furnishing a cylindrical, or other shaped vessel of any suitable size, which constitutes the polisher, with two metal handles, to be cast with the cups or they may be riveted to it afterwards, these handles are then provided with wooden handles to protect the hands from being burnt, the bottom of the cups or polishing surface is made convex with a flange projecting from said cup. This improvement was designed by George J. Prentiss, Fall River, Mass.

IMPROVEMENT IN CALENDAR CLOCKS.

This invention consists in a calendar movement of novel description, which effects in a very simple and certain manner all the changes that are rendered necessary by the varying length of the month; the year wheel being provided with an additional tooth controlled by a small leap year wheel to regulate the effective length of the tooth representing the month of February; and the month wheel is arranged in such relation to the year wheel, that its motion in one direction is controlled by the length of the different teeth of the year wheel, and that its motion in the other direction is communicated to the year wheel. At the end of each month the month wheel returns to its original position by the action of a spring gathered by the action of the clockwork. This invention was patented by Holly Skinner, of Huron, Ohio.

TRY-COCK FOR STEAM-BOILERS.

This invention combines in one steam-boiler try-cock, all the advantages secured from three or more try-cocks of the present construction. Its novelty lies in the use of a straight hollow tube inserted in the end of the boiler, and arranged to move up and down on a hollow axis; said axis communicating with the passage of the tube, and with the passage of a try-cock. The tube has a pointer on its outer end, and opposite the same a dial

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or under plate is placed. A spring holds the under end of the tube down, and thus keeps the inner end above the level of the water in the boiler. By this arrangement, by simply elevating the outer end of the tube and operating the cock, the same end will be brought down into the water, and the hight of the water indicated; for as soon as the tube enters the water, the latter will be squirted through the tube and escape at the try-cock. As soon as this occurs the engineer casts his eye to the dial and ascertains the hight of the water in the boiler. The inventor of this device is James Cummings, of Boston, Mass.

FOREIGN SUMMARY—NEWS AND MARKETS.

A paper was recently read before the Institution of Mechanical Engineers in London, by Thomas Greenwood, of Leeds, on a most important subject, namely, cutting files by machinery. This paper described the machine invented by M. Bernot, of Paris, and he had one present to show what it could do. He said the chisels could cut five times as many files as by hand, without being re-sharpened. The teeth cut on the files were raised with perfect regularity, and were fully better than those on hand-made files. Twelve of such machines are now in operation at Douai, in France; one in Brussels, Belgium; and the relative cost for cutting files by them was 8 cents per dozen: by hand, 64 cents. Mr. Greaves, who was present, said he had been engaged in file-cutting for 25 years, and he could state that this machine could cut as good files as those made by hand, if it were well attended. It was also stated that various such machines had been tried both in America and England, none of which had been so successful as the one of M. Bernot. In most of the machines heretofore made, the idea eliminated in them was an iron hand holding a chisel and an iron hammer striking blows on it. The vibration of the chisel, by this mode, caused irregularity in the teeth. In the new machine the blow is given by the pressure of a flat steel spring pressing upon the top of a vertical slide, at the lower end of which the chisel is firmly fixed. This slide is actuated by a cam which makes about a thousand revolutions per minute, and obviates all irregular vibrations.

At the same meeting, a paper was read on the superheating of steam in marine engines, by the president, J. Penn, the distinguished engineer. He stated that an opinion had long existed among engineers in favor of superheating steam, but until recently little had been done in regard to its practical application. Recent trials on a large scale led Mr Penn to adopt the conclusion that an advantage can be obtained from the use of superseated steam, amounting to an economy of fuel of from 20 to 30 per cent in marine engines, and that a moderate extent of superheating enables all the important advantages of the plan to be obtained. By so doing there is nothing objectionable involved from extra tear and wear, complication of apparatus or difficulty in lubrication. The real advantage in superheating the steam appeared to be in preventing the presence of water in the cylinder of the engine, thus insuring pure steam to work the piston, making it a real steam-engine and not a working mixture of water and steam. These views, by this engineer, harmonize with those expressed in the SCIENTIFIC AMERICAN, on this subject, in former volumes. In all condensing engines, the interior of the cylinder being open to the condenser during half the time of each revolution, the temperature of the cylinder is reduced to about 125°. When the steam is therefore admitted for the next stroke at a temperature of 260° Fah., it is robbed of considerable heat, and a quantity of water is thereby formed in the cylinder. A portion of this water may be evaporated again towards the end of the stroke by carrying the expansion down to a low pressure, but its effective value is lost during all the previous portion of the stroke. If, therefore, as much heat is added to common steam by superheating it before entering the cylinder as will supply the amount which is usually abstracted from it, not a drop of water is formed during the whole stroke; it remains dry steam to the end. The addition of 100° of heat to the temperature of steam insured the desired object with steam at 20 lbs. pressure on the square inch, as used in marine engines. This was the mode in which the superheating of steam, according to Mr. Penn's views, produced a saving.

The *Great Eastern* has been a scene of great activity since the termination of the coroner's inquest on the deaths caused by the explosion. It is not yet exactly known by the public how J. Scott Russell and the company have arranged matters between them and settled disputes, but nothing seems to have been done to retard the progress of repairs; these have been going on with great spirit, even amid vast crowds of visitors who have come from all parts of the country to pay for the right of inspecting the marine monster. Her day of departure for America is not definitely settled, and cannot be until her trial trip is made, which will take place in the early part of next month. The run will be about 800 miles, and if the engines work well she will at once commence to take in cargo and make preparations for crossing the Atlantic.

There has been an improvement in the cotton market during the week, and prices were slightly higher for fair and middling qualities. The stock in Liverpool is 589,000 bales, of which 446,000 are American; 55,000 bales were sold during the week. Great complaints have been made respecting the mixing of sand with American cotton, and the Cotton Broker's Association of Liverpool have presented a memorial to the American Chamber of Commerce on the subject, requesting its influence to stop the practice. It is stated that in last year's imports the sand and dust among American cotton amounted in weight to about 100,000 bales, and this mixture caused a depreciation in the value of the cotton greater than the proportion of sand in it. It is to be hoped that the people who practice such a system in packing their cotton will stop the evil. It is injuring our reputation, and also curtailing our profits, by depreciating the value of the article.

PRICES OF FOREIGN METALS, OCT. 20.

	£	s.	d.		£	s.	d.
Iron, English Bar and Bolt :—				Iron, Swedish, bars, per tun	11	10	0
In London, per tun.	7	0	0	Russian C C N D.	17	0	0
In Wales	6	0	0	Steel, Swedish Keg, nom	18	10	0
In Liverpool	6	10	0	Do. Rolled.	19	10	0
Staffordshire Bars.	7	10	0	Faggot.	20	0	0
Sheet, single,	9	0	0	Spelter	21	0	0
Double	10	10	0	Zinc, in sheets	27	10	0
Hoop.	8	10	0	Copper, Tile	107	10	0
Rod, round	7	10	0	Tough Cake	107	10	0
Nail Rod, square	7	10	0	Sheathing & Bolts, per lb.	—	—	12
Shipping Iron :—				Sheet	—	—	12
Staffordshire Bars.	7	10	0	Bottoms	—	—	12½
Sheet, single.	9	0	0	Old	—	—	10
Double	10	10	0	Yellow Metal	—	—	10
Hoop	8	10	0	Lead, British Pig.	22	15	0
Rod, round	7	10	0	Spanish	22	10	0
Nail Rod, square	7	10	0	Sheet	23	10	0
Iron, Rails, in Wales, cash	6	5	0	Tin, English Block, nom	136	0	0
Do. 6 months	6	0	0	Bar	137	0	0
In Staffordshire	7	0	0	Refined	142	0	0
Railway Chairs, in Wales	4	0	0	Foreign Banca	144	0	0
In Clyde	4	0	0	Straits	140	0	0
Pig No. 1, in Clyde	2	13	6	Tin Plates, Charcoal, IC, per box	1	10	0
2-5ths No. 1 and 2-5ths No. 3	2	13	0	Do. IX	1	16	0
Staffordshire Forge Pig, at the works, L. W., nom	4	0	0	Coke, IC	1	5	0
Welsh Forge Pig	—	—	—	Do. IX	1	13	0
Acadian Pig, Charcoal	8	15	0	Canada, Plates, p'r t'n	12	0	0
Scotch Pig, No. 1, in London	3	10	0	Quicksilver, per bottle	7	0	0

[The above are prices within three per cent discount, the pound being valued at $4.85.

New York Markets.

COAL.—Anthracite, $4.50; Liverpool, $9.34; Sidney, $5 per tun.

COPPER.—Refined ingots, 22½c. per lb.; sheathing, 26c.; Taunton yellow metal, 20c.

COTTON.—Ordinary, 8½c. a 8¾c.; good ordinary, 9½c. a 10c.; middling, 11⅜c. a 11¾c.; good middling, 12c. a 12⅜c.; middling fair, 12¾c. a 13c.

DOMESTIC GOODS.—Shirtings, bleached, 30 a 34 inch per yard, 7c. a 8¼c.; sheetings, brown, 36 a 37 inch per yard, 5½c. a 8¾c.; sheetings, bleached, 36 inch per yard, 7¼c. a 15c.; calicoes, fancy, 6c. a 11c.; cloths, all wool, $1.50 a $2.50; cloths, cotton warp, 85c. a $1.37; cassimeres, 85c. a $1.37½; satinets, 30c. a 60c.; flannels, 15c. a 30c.; Canton flannels, brown, 8½c. a 13c.

FLOUR.—State superfine brands, $4.55 a $4.60; Ohio common, $4.70 a $4.80; Ohio, good and choice extra brands, $5.60 a $6.75; Michigan, Indiana, Wisconsin, &c., $4.80 a $5.20; Genesee, extra brands, $5.40 a $7; Missouri, $4.75 a $7; Canada, $5.50 a $6.25; Richmond city, $6.25 a $7.25.

HEMP.—American undressed, $140 a $150; dressed, from $190 a $210. Jute, $90 a $95. Italian, $275. Russian clean, $200 per tun. Manilla, 6½c. per lb.

INDIA-RUBBER.—Para, fine, 60c. per lb.; East India, 45c. a 52c.

INDIGO.—Bengal, $1 a $1.60 per lb.; Madras, 75c. a 95c.; Manilla, 60c. a $1.15; Guatemala, $1 a $1.15.

IRON.—Anthracite pig, $24 per tun; Scotch, $23; Swedish bar, ordinary sizes, $87.50 a $90; English refined, $53 a $54; English common, $43 a $44; Russian sheet, first quality, 11c. a 12c. per lb.; English, single, double and treble, 3½c. a 3⅞c.

LEAD.—Galena, $5.70 per 100 lbs.; German and English refined, $5.55 a $5.60; bar, sheet and pipe, 6c. a 6½c. per lb.

LEATHER.—Oak slaughter, light, 33c. a 34c. per lb.; Oak, medium, 32c. a 35c.; Oak, heavy, 31c. a 32c.; Hemlock, slaughter, light, 23c. a 23½c.; Hemlock, medium, 23c. a 24c.; Hemlock, heavy, 22½c. a 23c. Upper Leather.—Rough, oak, light, 31c. a 32c.; Oak, heavy, 30c. a 31c.; Oak, Southern tan, 30c. a 31c.; rough Hemlock, good light, 26c. a 27½c.; Hemlock, good heavy, 24c. a 26c.; Hemlock, polished, 14c. a 15c.; Hemlock, buff, 15c. a 18c. Cordovan, 50c. a 60c. Morocco, per dozen, $18 to $20. Patent enameled, 16c. a 17c. per foot, light Sheep, morocco finish, $7.50 a $8.50 per dozen. Calf-skins, oak, 57c. a 60c.; Hemlock, 56c. a 60c.; Belting, oak, 32c. a 34c.; Hemlock, 28c. a 31c.

LUMBER.—Timber, white pine, per M feet, $17.50; Timber, yellow pine, $35 a $36; Timber, oak, $18 a $38; Timber, eastern pine and spruce, $14.50; White Pine, select, $25 a $30; White Pine, box, $14 a $18; White Pine, flooring, 1¼ inch, dressed, tongued and grooved, $24.50 a $25; Yellow Pine, flooring, 1¼ inch, dressed, tongued and grooved, $29 a 32; White Pine, Albany boards, dressed, tongued and grooved, $20 a $21; Black Walnut, good, $45; Cherry, good, $45; White Wood, cherry plank, $42; Spruce Flooring, 1¼ inch, dressed, tongued and grooved, each, 22c.a24c.; Spruce Boards, 15c. a 17c.; Hemlock Boards, 12½c. a 14c.; Hemlock Joist, 3 by 4 inch, 12½c. a 14c.; Shingles, cedar, per M, $28 a $35; Shingles, cypress, $12 a $25; Staves, W. O. pipe, light, $55 a $58; Staves, white oak, pipe, heavy, $75 a $80; Staves, white oak, bbl. culls, $20; Heading, white oak, hhds., $65. Mahogany—Duty, 8 per cent. ad. val.—St. Domingo, fine crotches, per foot, 35c. a 45c.; St. Domingo, ordinary do., 20c. a 25c.; Honduras, fine, 12½c. a 15c.

NAILS.—Cut at 3c. a 3¼c. per lb. American clinch sell in lots, as wanted, at 5c. a 6c.; wrought foreign, 3¾c. a 3½c.; American horse-shoe, 14½c.

OILS.—Linseed, city made, 57c. per gallon; linseed, English, 58c.; whale, bleached winter, 58c. a 60c.; whale, bleached Fall, 58c.; sperm, crude, $1.35; sperm, unbleached winter, $1.40; sperm, unbleached Fall, $1.35; lard oil, No. 1 winter, 90c. a 95c.; refined rosin, 30c. a40c.; camphene, 47c. a 49c.; fluid, 54c. a 56c.

PAINTS.—Litharge, American, 7c. per lb.; lead, red, American, 7c.; lead, white, American, pure, in oil, 8c.; lead, white, American, pure, dry, 7¼c.; zinc, white, American, dry, No. 1, 5c.; zinc, white, French, dry, 7¼c.; zinc, white, French, in oil, 9½c.; ochre, ground in oil, 4c. a 6c.; Spanish brown, ground in oil, 4c.; Paris white, American, 75c. a 90c. per 100 lbs.; vermillion, Chinese, $1.12½ a $1.22; Venetian red N. C., $1.75 a $2.31½ per cwt.; chalk, cash, $4.75 per tun.

PLASTER-OF-PARIS.—Blue Nova Scotia, $2.75 a $2.87½ per tun; white Nova Scotia, $3; calcined, $1.20 per bbl.

RESIN.—Common, $1.60 per 310 lbs. bbl.; No. 2, &c., $1.70 a $2; No. 1, per 280 lbs. bbl., $2.25 a $3; white, $3.25 a $4.50; pale, $5.50.

SPELTER plates, 5½c. a 5¾c. per lb.

STEEL.—English cast, 14c. a 16c. per lb.; German, 7c. a 10c.; American spring, 5c. a 5½c.; American blister, 4½c. a 5½c.

TALLOW.—American prime, 10¾c. to 10⅞c. per lb.

TIN.—Banca, 32¾c. a 33c.; Straits, 30¼c.; plates, $7.25 a $9.50 per box.

TURPENTINE.—Crude, $3.62½ per 280 lbs.; spirits, turpentine, 46c. per gallon.

WOOL.—American, Saxony fleece, 50c. a 55c. per lb.; American full blood merino, 46c. a 48c.; extra, pulled, 45c. a 50c.; superfine, pulled, 37c. a 41c.; California, fine, unwashed, 24c. a 32c.; California, common, unwashed, 10c. a 18c.; Mexican, unwashed, 11c. a 14c.

ZINC.—Sheets, 7¼c. a 7½c. per lb.

The foregoing rates indicate the state of the New York markets up to October 20th.

The price of cannel coal shipped from Liverpool, according to the table of the agent, T. W. Parmele, of this city, is $9.34 per tun of 2,240 lbs. This is the price delivered at dock. The common house Orrel (Liverpool) is $7.43 per tun of 2,240 lbs. These prices depend in a great measure on the freight charges, which sometimes have an extensive range.

The breadstuff market to Great Britain is very active, with large shipments of flour and grain at improved rates. There is a fair business to the European continent. Vessels are in request to carry coals from the British Channel to China for the use of the British steam marine there, and high prices are paid. Cotton freights here are very firm, and rates rather tend upward.

The market for sole leather remains quiet. Eastern dealers and manufacturers are purchasing in small quantities only, just sufficient to supply customers, and keep their manufactories in operation; the depressed state of the boot and shoe trade rendering it impolitic for them to purchase in advance of immediate requirements. From the West there is but a light trade. Dealers feel unwilling to lower the rates to accommodate manufacturers, while the prices of raw material are held so high.

The progress of the manufacturing system in the southern States would seem, from some statistical returns recently published, to be much more rapid than is generally supposed. South Carolina, Alabama, Louisiana, Kentucky and Tennessee are now manufacturing cotton and woolen goods to a large extent.

THE MONSTER BALLOON.—As we were passing Reservoir-square recently (the site of the burned Crystal Palace, corner of Fortieth-street and Sixth-avenue), we observed workmen busily engaged in fencing the grounds, preparatory to the inflation of Lowe's great balloon. The plan is to exhibit it for a small charge, for a week or two, during the experiment of testing its tightness, and, when all is ready, to take advantage of the first suitable weather, and, without any notice, to sweep away on the daring voyage across the Atlantic.

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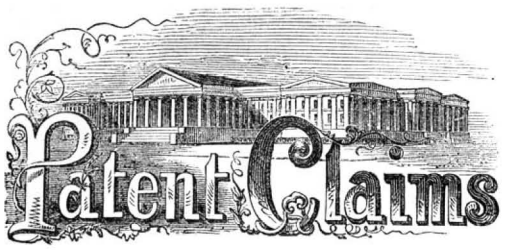

ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING OCTOBER 18, 1859.

[Reported Officially for the SCIENTIFIC AMERICAN.]

*** Pamphlets giving full particulars of the mode of applying for patents, size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

25,795.—S. C. Abbot, of Zanesville, Ohio, for an Improvement in the Adaptation of Wads to Shots and Shells:

I claim, in combination with a shot or shell, that receives its rotation by the action of the atmosphere in its flight, and which has an open funnel-shaped base, a similarly-shaped open wad or packing, that when expanded by the gas, shall impinge, both upon the bore of the gun and the interior of the shot, or shell, as described and represented.

25,796.—Avery Babbitt, of Auburn, N. Y., for an Improvement in Jacquard Machines:

I claim, first, Arranging two or more trap-boards in one frame, in such manner that when all the said trap-boards, so arranged, are lifted, for the purpose of opening the shed, all the untrapped knot cords may pass said trap-boards without obstruction, in combination with an ascending and descending suspension-board, substantially as above described.

Second, In combination with the Jacquard machine, I claim the device represented on the sides of the machine for working the journals, or parts of journals, consisting of the pin-wheel, Z, shaft, B′, hooks, y y y y, and the hooks, o o o o, and the dog, E′, substantially in the manner and for the purposes specified.

Third, Dividing the journals commonly used in two or three-ply Jacquard weaving machines, and working them in any required order, substantially in the manner and for the purpose above specified.

25,797.—E. Ball, of Canton, Ohio, for an Improvement in Harvesters:

I claim, first, The hinged plate, G, constructed as shown and specified, in combination with the finger-bar, D, and brace-plate, E, substantially as described.

Second, I claim the combination of the coupling-arm, t (swiveled only at the point of connection with the main frame), in combination with hinged plate, G, hinged brace-plate, E, and guide-piece, F, substantially as set forth.

Third, I claim the guide-piece, F, in combination with the brace-rod q, hinged plate, G, brace-plate, E, coupling arm, t, and chain, V, substantially as described.

Fourth, I claim the combination and relative arrangement of spur, k′, with coupling arm, t, and pitman, k, as and for the purposes set forth.

Fifth, I claim the combination of the hinged plate, G, and adjusting screw, s, with the slotted guide-piece, F, hinged brace-plate, E, and chain, b″, arranged as and for the purposes set forth.

25,798.—Daniel Barnum, of New York City, for an Improvement in Steam-engines:

I claim the method of constructing and combining adjustable cut-off cams and adjusting screws, and a revolving and sliding rock-shaft, substantially as specified, and of combining these with the means described, for working puppet valves in steam-engines, substantially as and for the purposes specified.

I claim the method of constructing, or using, or adjusting the cut-off cams, l l′ for the purpose of enabling me to fix or to adjust the point at which the steam is to be cut off, during any portion of the stroke, whether it be done while the engine is in motion or at rest, substantially as described and shown.

25,799.—Wm. W. Batchelder, of New York City, for an Improvement in Construction of Vapor Lamp-burners:

I claim modifying the flame under the retort, by means of the wires, a l a2, or their equivalents, in such manner that the deposit of carbon, shall be prevented, and the blue flame produced, as set forth.

I claim deriving the gas for heating the retort from the gas-pipe, d, after its commixture with air, and before it reaches the illuminating jet, m, by means of the aperture, n, as set forth.

25,800.—John Beach, of DeRuyter, N. Y., for an Improvement in Cheese Hoops:

I claim, first, A hoop having a cross-cut, or division, at its periphery, and constructed to open and close as described, when provided, on opposite sides of said division, with hood or eye-straps, united by a tie-band of oval configuration, or other similar shape, and serving, in connection with the eye-straps, to open and close the hoop, and to hold the same, when expanded or contracted, substantially as set forth,

Second, Providing the oval tie-band to the hook or eye-straps of the opening and closing hoop, with a lever or handle, arranged to cross the oval band, at points intermediate to the intersections therewith of the transverse and conjugate axis of the band, and secured to the band on its one side, but projecting freely through it on the opposite, essentially as specified.

25,801.—C. G. Bloomer, of North Kingston, R. I., for an Improvement in Operating Window Blinds:

I claim the segmental disk, D, or its equivalent, and the spring, F, or its equivalent, in combination with one of the slats of a blind, when arranged to operate in the manner substantially as described for the purposes set forth.

25,802.—M. S. Bringier, of New Orleans, La., for an Improved Steam-boiler:

I claim the arrangement of a series of horizontal tubes, or pipes, connecting two cylindrical chambers, or reservoirs, of water and steam, in combination with the steam cylinder, C, connecting the same chambers, substantially as described.

25,803.—Wm. M. Bryant, of Washington, D. C., for a Smoking-tube:

I claim a tubular tobacco-pipe which contains the supply of tobacco within it, and is furnished with a spring and follower, or their equivalents, that force up the tobacco to the burning point, or chamber, as as fast as it is consumed, substantially in the manner and for the purpose set forth.

25,804.—S. N. Campbell, of Elgin, Ill., for an Improved Churn:

I claim the arrangement and combination of the button, K, dasher rod, F, movable slats, H H′, pieces, L, and bar, J, as and for the purposes set forth and described.

[This invention consists in adjusting the slats of a dasher so as to adapt it to thick or thin cream, the object being to facilitate the operation of churning by creating a great agitation of the cream in the churn.]

25,805.—John H. Carter, of Cincinnati, Ohio, for Improvements in the Construction of Hydrants for Filtration:

I claim the cylindrical inner vessel, g, within the case, A, and made removable as represented, in combination with the receiver, B, for receiving the sediment, as described, and the cap, e′, for favoring the direction of the sediment downward, in the manner and for the purpose set forth.

25,806.—Asa L. Caswell, of Lansingburgh, N. Y., for an Improvement in Operating Gun Carriages:

I claim, first. Returning the gun up to the port-hole, after being discharged, by means of a roller and cords, or chains, operated by a lever or its equivalent, when the same are arranged in the manner, and dispense with the use of gun tackle, as set forth.

Second, I claim the manner described, or equivalently the same, for securing the gun and carriage in a fixed position upon the truck, so as to maintain a given range for any number of discharges, as set forth.

[This invention consists in the employment of a large roller placed under the truck of the carriage, and supported between the carriage-ways, around which is passed ropes or chains, the ends of which are attached to the front and rear part of the truck frame in such a manner that these cords or chains can be tightened-up when necessary. It further consists in operating this roller by suitable levers, which are to be connected and disconnected with the shaft of said roller.]

25,807.—Leverett Clark, of Monticello, N. Y., for an Improvement in Hem-folders:

I claim the hem-folder, composed of a straight gage, a, and adjustable plate, C, constructed as described, and a bar, b, the whole combined as described, either arranged as shown in Figs. 1, 3 and 4, or as in Figs, 2, 5, and 6, and operating substantially as described.

25,808.—B. R. Cole, of Geneva, N. Y., for an Improved Method of Opening and Closing Gates:

I claim the arrangement of the bar, G2, to the levers, G3 and G4, at such points as to give their lower ends the same motion inward or outward at the same time, substantially as set forth.

25,809.—Jonathan Creager, of Cincinnati, Ohio, for an Improvement in Machines for Sawing Beveled Curves:

I claim, first, The combination of the inclined rest, R, with a crown saw, for the production of a crowning cylindrical segment.

Second, The combination of a rocking-rest, H, with a crown saw, for the manufacture of a cylindrical segment having oblique axes.

25,810.—James Cumming, of Boston, Mass., for an Improved Try-cock for Steam-boilers:

I claim the combination with an ordinary try-cock, E, of a straight hollow tube, D, moving vertically on axis, C, and which is also the indicator at its outer closed end, and extending through the end or side of the boiler, and at certain periods remaining elevated above the level of the water, but capable of being brought below the same, whenever necessary, substantially as and for the purposes set forth.

25,811.—Wm. P. Curry, of Vincennes, Ind., for an Improved Feed-water Apparatus for Steam-boilers:

I claim the arrangement of the rods, G G′ H H′ I I′, or their equivalents, to operate in combination with the disks, i e k m or their equivalents, and with the float, B, and stop-valve, K, substantially as and for the purposes set forth.

[The object of this invention is to obviate the injurious influence on the regularity of the feed caused by the spring of the rods which connect the float in the boiler with the stop-cock or valve in the feed-pipe. The rods between said float and stop-valve are so arranged that a double connection is effected, and that one of the rods always pulls as well when the float rises as when it sink down. By this arrangement the slightest motion of the float affects the valve, no matter what the distance between said valve and the boiler may be.]

25,812.—Andrew J. Curtis, of Frankfort, Maine, for an Improvement in Operating Field Gates:

I claim the improved arrangement of mechanism described, for opening and closing a gate, the same consisting of the lever, G, and the connecting-rods, M N, applied to the said lever and the gate posts, H I, substantially as and for the purpose set forth.

And in combination therewith, I claim the peculiar arrangement of the block, f, the same operating in connection with the lever, G, in the manner and for the purpose specified.

25,813.—J. B. Dagne, of Ashley, Ohio, for an Improvement in Construction of Evaporating Apparatus:

I claim the employment of the pan, F, which is provided with two or more compartments and situated over a furnace, when said pan is used in connection with the slides, F and C, and damper, D, the whole being combined and arranged substantially in the manner set forth, for the purpose of forming a sugar evaporator, as described.

25,814.—John Danner, of Canton, Ohio, for an Improvement in Sleeping-cars:

I claim, first, The combination of the hinged false back, d, with the permanent back, a, as and for the purposes set forth.

Second, I claim making each alternate back, a, with a false back, d, in combination with making each alternate back, a′, shorter than the backs, a, and hinged to the seat, e, substantially as and for the purpose set forth.

25,815.—John Ebner and Frank Lenthy, of Lancaster, Pa., for an Improvement in Harvesters:

We claim the arrangement of the three eccentrics, C C D, revolving shaft of the driving-wheel, in combination with the rake-connecting mechanism constructed and operating in the manner described.

25,816.—Daniel Eldred, of Monmouth, Ill., for an Improvement in Plows:

I claim the arrangement for joint operation, of the share frames, B B, axle, H, and coulter, L, as and for the purpose set forth.

[The object of this invention is to obtain a plow that will be capable of turning a furrow from the same side of the land while moving in either direction across the field, and also to obtain one that may be readily manipulated and on which the driver may ride while the plow is in operation. The invention consists in having two shares attached to movable or adjustable frames secured to one axle, and using an adjustable coulter and axle; the whole being so arranged that the desired object is attained.]

25,817.—Gilmore Emery and Aaron C. Wilson, of Newfield, Maine, for an Improvement in Plows:

We claim the arrangement of the various parts of the plow, when constructed as described for the purposes set forth.

25,818.—Frank P. Goodall, of Deering, N. H., for an Improvement in Pruning-knives:

I claim the improved article of manufacture, or combination of pruning-knife and arm rest, arranged substantially as specified.

25,819.—Merritt Goodman, of Whitlocks, Cal., for an Improvement in Machines for Crushing Quartz:

I claim a revolving mortar, I, or stamping-bed, in combination with a hollow stamp and shaft, A, as described.

25,820.—Oliver C. Green, of Dublin, Ind., for an Improvement in Clothes-racks.

I claim the arrangement and combination of the center posts, A a, arms, B C, and braces, D E, operating in the manner and for the purposes set forth.

25,821.—Joel Haines, of West Middleburgh, Ohio, for an Improvement in Field Fences:

I claim the peculiar construction of the braces so as to adapt them to the keys, when combined with a sill having one or more notches, so as to hold the fence perpendicular when the sill is inclined substantially as described.

25,822.—Wm. Hall, of Indianapolis, Ind., for an Improved Apparatus for preventing Horses from running away:

I claim the apparatus described, when constructed and operated in the manner and for the purpose described.

25,823.—Wm. Hall, of Indianapolis, Ind., for an Improved Lightning-rod:

I claim as an article of manufacture, the construction of a lightning-rod presenting a great amount of conducting-surface in a compact form, when the same is constructed in the manner set forth.

25,824.—Samuel W. Hamsher, of Decatur, Ill., for an Improvement in Harrows:

I claim the arrangement of the harrow-frames, toothed-roller, and hinged adjustable arms, as set forth and explained, and for the purpose stated.

25,825.—Joseph Harris, of Alleghany, Pa., for an Improvement in Railroad Brakes:

I claim, first, The combination of the winding-apparatus, the weight, w′, lever, t, rod, r′, bent lever, e′, sliding-ring, d′ sleeve, r, anti-friction ring, z′, and z″, conical center-piece, p, collar, c″, with friction-plates, a′, and a″, and spring-plates, b′ and b″, also screws, n′ and n″, arranged in the manner and for the purpose substantially of operating a railroad brake.

Second, The combination of the pawl, t, and spring, u, with ratchet, s, and drum, l, with short chains, k k, and rods, h h, the arm, m m, with pulleys, q q, connected by chains, rods or ropes, for applying and maintaining the strain of a railroad brake at the center of each car, substantially as described and set forth.

Third, The combination of the rod, v, with the long arm of the pawl, t, and the cross-lever, y, connecting the shaft of the bunter, x, to pawl, t, for the purpose of setting the brakes free; the whole substantially as described and set forth.

25,826.—James Hawkins, of Wilkins township, Pa., for an Improvement in Steam Plows:

I claim the arrangement of the frames, A and F, levers, J and E, caster-wheels G and I, drivers, B, crank-shaft, S, cutter, P, toothed cylinders, C and H, levers, D and N, operating conjointly as set forth for the purposes specified.

25,827.—Joseph Hollen, of Fostoria, Pa., for an Improvement in Knitting-machines:

I claim the combination of a needle, the barb of which is pressed by its own spring into its own groove, with a thread-carrier, to release the barb and lay the thread therein, and a supporting-guide to sustain the needle, when arranged and operated substantially in the manner and for the purpose described.

25,828.—Francis A. Hoyt, of Boston, Mass., for an Improved Water-gage for Steam-boilers:

I claim the described arrangement of the steam whistle, its valve, conduit, and valve-seat, relatively to the dry steam chamber and the operating lever of the float.

25,829.—Thomas J. Hudson, of Newbern, N. C., for an Improvement in Packing Piston-rods of Steam-engines:

I claim the method of packing the glands, a a, and applying the gland, c, with the packing in d d.

25,830.—Wm. H. Hunt, of Brooklyn, N. Y., for an Improvement in the Construction of Vapor-burners:

I claim the combination, in a vapor-burner, of a conic frustum, l, and draft-holes, k, substantially as specified, in combination with the orifice, n, and damper, v; the whole being constructed and combined substantially as and for the purpose specified.

25,831.—George P. Hunt, of New York City, for an Improvement in Oil-cans:

I claim the arrangement of the valve with the point of the tube or spout, as described, in combination with the extension of the point of the valve for operating it, by which arrangement, when the point of the valve is relieved from pressure, the further discharge of oil from withen the tube is prevented, as set forth.

25,832.—J. Burrows Hyde, of Newark, N. J., for an Improvement in the Construction of Compound Blow-pipes:

I claim the compound conical nozzle, g, constructed with the projecting tubes, n and k, as described, combined with the concentric elastic tubes, e and f, as described.

Second, The receiving tubes, a and b, with their projecting tubes, c and d, for attaching thereto the elastic tubes, as described.

25,833.—A. Kirlin, of New Boston, Ill., for an Improvement in Corn-planters:

I claim the cam I, spring-arm, J, ratchet and pawl, K L, when the same are arranged as set forth and operated by the marker-wheels, G G, for giving motion to the rotary hopper-bottoms, for planting the corn, as described.

[This invention accomplishes two important objects, viz: spacing off the ground and dropping the seed; the spacers or markers being arranged upon radial arms projecting from a hub, serve to give motion to the dropping device, all of which in combination constitute the invention.]

25,834.—George H. Kitchen, of New York City, for an Improvement in the Construction of Gas-regulators:

I claim the construction of the valve-chamber, A, having the valve fitted within it, substantially as described, with a series of recesses, d d, whose width increases in an upward direction, or an equivalent series of passages surrounding the valve and having their area of opening increased by the ascent and diminished by the descent of the valve, as described.

[This invention consists in a certain novel system and arrangement of passages surrounding a chamber, in which works a cup-shaped or disciform valve that is operated upon directly by the pressure of the gas, whereby, the said valve is caused, by the action of the gas upon it, to regulate the flow of the gas to the burners under all conditions, by giving an enlarged opening to the passages as the valve is raised, and a diminished opening as the valve is depressed.]

25,835.—Adam Klaus, of Belleville, Ill., for an Improvement in Seed-planters:

I claim the valve, r, in combination with the sliding door, p, when the same are operated simultaneously with the seed slide, substantially in the manner and for the purpose described.

[This seed-planter is provided with covering-shares and a cutter, that are so arranged that two small furrows are drawn on each side of the seed, leaving the latter a little elevated in the ground so that it is protected against being drowned by heavy rains. The seed is de-

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posited on the ground from a discharge-tube, in the lower part of which one throw of seed is always kept in store so that the regularity of the rows ss not disturbed by the time which it takes for the seed to reach the ground. The dropping-apparatus is also connected with a registering-mechanism that serves to keep account of the number of hills planted during a certain time.]

25,836.—Jesse S. Lake, of Smith's Landing, N. J., for an Improved Steering-apparatus:

I claim the arrangement of catches, I I, braces, I, L, collar, O, pin, F, in combination with the barrel, C, substantially in the manner and for the purpose set forth.

25,837.—James Lancelott, of South Providence, R. I., for an Improvement in Making Ornamental Chains:

I claim, first, The employment or use of the fillings, b', in the female die, Q, when used in connection with a traveling die, r, for the purpose of ensuring the proper presentation of the blanks to the latter, and at the same time admitting of a proper cutting-edge for the female die, Q.

Second, The employment of a forming-die, J, in connection with a rotating or partially-rotating die, r, arranged substantially as shown to ensure, simultaneously with the process of swaging the blanks into the proper shaped links, the proper adjustment of the latter for interlocking of the same.

Third, The decreased diameter of the upper portion of the forming-die, J, so as to ensure the adhesion of the cap, cup, or link to it, and enable the said die to perform the double function of die and carrier, when said die, J, is used in connection with the die, r, to operate conjointly as and for the purpose set forth.

Fourth, Constructing the die, r, with a rod, v', with or without shears or projections, a', and arranged substantially as and for the purpose set forth.

Fifth, The clearer rod, h, and collar, n, either or both applied to the forming-die J, and arranged to operate in connection with the die, r, and rod, v, substantially as and for the purpose set forth.

Sixth, The clamps, j, in connection with the swage or clinching-tool, R, or its equivalent, arranged to operate conjointly, as shown and for the purpose specified.

Seventh, The guide-plate, f, in connection with the swage or clinching-tool, R, the former serving as a guide to the latter, and ensuring its proper action.

Eighth, The swage or clinching-tool, R, when constructed as shawn, to bend or clinch the arms of the links, and at the same time keep the arms of the uppermost link in proper position, so that the latter may readily receive the succeeding link.

25,838.—S. E. Lanphear and O. D. Barrett, of Cleveland, Ohio, for an Improved Washing-machine:

We claim supporting the disk, E, by its stem, C, on the standard, B, as and for the purpose set forth.

25,839.—Evan Leigh, of Manchester, England, for an Improvement in Cotton-spinning Machinery. Patented in England, Feb. 26, 1858:

I claim, first, The construction of top rollers and spindles with the arrangement of one or more of the bosscs loose revolving thereon.

Second, The application of a journal, or all kinds of shafting spindles, studs, or axles, having the bearing-part of the shaft, spindle, or axle or stud larger in diameter than the part immediately outside the bearing.

Third, The rounding out or dishing the edges of the steps or bosses, in combination with the tapering of journals or axles, of all kinds, by which I obtain the action of capillary attraction, for the purpose set forth.

Fourth, I also claim the application of a top roller of a spinning-machine to its spindle in such a manuer as to enable such top roller to rotate on the spindle and to rock in a longitudinal direction, in order that it may properly adjust itself to the under roller, while the two may be in use.

25,840.—Frank Maxson, of San Francisco, Cal., for an Improved Amalgamator:

I claim the use of the eccentric revolving-pan, constructed and operated as described, in connection with the amalgamated plate, as specified.

I also claim the arrangement of the shaft, E, projection pin, F, with the slotted piece, C', and wood, D', whereby a more or less eccentric motion is imparted to the pan, A, as described.

25,841.—Thomas J. Mayall, of Roxbury, Mass., for an Improvement in Composition of Emery for Grinding and Polishing Tools:

I claim my new compound for emery sharpening and polishing tools, the same being made by combining 15 lbs. of emery, 1 lb. of india-rubber or gutta-percha, and 5 oz. of sulphur.

25,842.—C. A. McEvoy, of Richmond, Va., for an Improvement in Metallic Seals for Letters, &c.:

I claim the use together, in the manner described, of the metallic concave disks, having sharp points projecting from their circumferences, substantially as set forth.

[This invention consists in the use of two concave disks having sharp points. One disk is placed under the back leaf of the envelop, and its points inserted through said leaf and the fly-leaf; and the other disk is placed on the outside of the fly-leaf directly over the first disk. Now, by pressing the two disks together the points of the same bent down and inward by coming in contact with the concave surfaces of the disks, and thus made to lock the back and fly-leaf of the envelop so securely together that they cannot be separated, except by tearing the same all round the seal. This is a very convenient, cheap and practical metallic seal for letters.]

25,843.—Thomas McQuiston, of Morning Sun, Ohio, for an Improvement in Cultivators

I claim the described arrangement of the elevated axle, D, beam, A A', brackets, C C', and rods, B B', the whole being constructed in the manner and for the purposes set forth.

25,844.—John H. Mears and George Cameron, of Oshkosh, Wis., for an Improvement in Car-coupling:

We claim, first, the tongue, G, for retaining link, H, constructed and operating as described.

Second, The arrangement of yoke, A, lever, C, and spring, B, and connecting-rod, F, constructed and operating as described.

25,845.—Adam Miller, of Mount Pleasant, Iowa, for an Improved Mole Plow:

I claim the employment of the rod, H, in combination with the coulter, B, provided with staples, o o o', and the mole, J, provided with the hooks, m n and s s, substantially as and for the purposes specified.

25,846.—John Morrison, of De Witt, Ill., for an Improved Mole Plow:

I claim the draft chain, G, bar, F, loops, H H, and the adjusting screw rods, J J, or their equivalents, combined, arranged and applied to the plow, substantially as and for the purpose set forth.

[This invention consists in a novel means employed for varying the position of the line of draught relatively with the beam and mole, whereby the implement may be readily guided or moved by the draught alone to give it the desired direction.]

25,847.—W. H. Morrison, of Nottingham, England, for an Improved Machine for Manufacturing Bonnet and Cap Fronts, &c.:

I claim the application, in apparatus or machinery of the character referred to, of bars or gages, h h, operated to move simultaneously towards the lace or other fabric, substantially as explained.

I also claim the adaptation of plates, f f, operating in manner and for the purpose substantially as explained, when employed in the manufacture of bonnet and cap fronts, rouches, and such like articles of millinery.

25,848.—Enoch Osgood, of Boston, Mass., for an Improvement in Cotton Gins:

I claim, first, The rollers, B B, plates, C C, and bands, D, arranged substantially as and for the purpose set forth.

Second, The combination and arrangement in a cotton gin or wool burring-machine, of the clearer, K, rollers, B B, angular plates, C C, bands, D, slotted arms or bars, J J d d, pinion, G, and wheel, I, in the manuer and for the purpose described.

25,849.—Sewall Pearson, of Boston, Mass., for an Improved Cabinet Chair:

I claim arranging in a bureau, chair, or other piece of furniture, A, in combination with a perforated seat, B, and with a self-closing pot, G, a water tank, C, which forms the back for the seat, and which communicates with the pot by means of a spout, E, substantially as and for the purpose specified.

[This invention is of particular value for sick persons, and it is so arranged that no stench can escape into the room. At the same time, the back of the seat is warmed by the contents of a tank that is filled with hot water, and which communicates with the pot under the seat. The whole is enclosed in a bureau, chair, or other piece of furniture, the appearance of which makes it fit for any room.]

25,850.—Geo. J. Prentiss, of Fall River, Mass., for an Improved Polishing-iron:

I claim the polishing-cup, A, as s set forth, having two handles, C E, arranged as represented and described, or in any other manner, substantially the same, for the purposes mentioned.

25,851.—Hiram M. Smith, of Richmond, Va., for an Improvement in Trusses for Relieving Piles:

I claim, as improvements in the construction of anti-hemorrhoidal pads, first, The manner of sustaining such pads by means of springs passing from the pad to the front of the patient, and in a spiral form along the groin to a point over the hip joint, in combination with the plan of sustaining the instrument by flexible fastenings attached above the hip joints, thus making the instrument self-adjusting and enabling the patient to exercise in any position without inconvenience.

Second, The manner of balancing the instrument by means of flexible fastenings attached over the hip joints, no matter how the arms of the pad may be varied.

25,852.—Joseph W. Sprague, of Rochester, N. Y., for an Improvement in Tubular Connection of Bridges:

I claim the described series of clutches, C, provided with bands, c, in combination with the tubular sections, B, for the purposes substantially as set forth.

25,853.—David H. Stickney, of Cincinnati, Ohio, for an Improvement in Cocks:

I claim the supplementary chamber, D, and stationary stuffing-box, C, in combination with a hollow piston, E, having ingress apertures, G, adapted to be placed on either side of the said stuffing-box by the motion of the piston, as set forth.

25,854.—A. J. Thompson, of Malden, Mass., for an Improvement in Bustles:

I claim the combination of a spring bustle of a flat spring or springs, b, united at their ends, to form the perimeter of the bustle, or its frame-work, and spread, or divided, to establish a base at their bearing surface or surfaces against the body of the wearer and spiral springs, c, of conical configuration, and arranged to form cross-ties to the flat springs with their bases resting against the base formed by the latter, and for action in concert with the latter, and unitedly, essentially as set forth.

25,855.—Elijah Thorn, of Selma, Ohio, for an Improvement in Portable Crab for Mole Plows:

I claim the arrangement of the frame, F, as constructed with the boxes, a a, which are attached to the rear of the frame, A, and with the axle, I, and wheels, J J; the several parts being connected together and used, not only for elevating the machine, but for guiding its rear and changing its position, substantially as set forth.

25,856.—Eben C. Tuttle, of Naugatuck, Conn., for an Improvement in the Manufacture of Hoes:

I claim the construction of a hoe, as a new article of manufacture, by securing the eye in the blade by two projecting swells or beads, a and b, when constructed and fitted for use substantially as described.

25,857.—Benj. F. Wells, of Georgetown, D. C., for an Improvement in Naval Architecture:

I claim deriving the lines of vessels of all kinds and dimensions from sections of a circular spindle of any dimensions or proportions, substantially as described and shown.

25,858.—Wm. Wheeler, of West Poultney, Vt., for an Improved Carpet-stretcher:

I claim the stretcher, C, when provided with the notch, r, and the heel points, t t, for the purpose set forth.

25,859.—J. T. Wilder, of Greensburgh, Ind., for an Improved Horizontal Water-wheel:

I claim, first, Constructing a water-wheel with two sets of involute buckets, whose capacity shall be in the relative proportion to each other, as specified, for the purpose set forth.

Second, The combination, with a wheel such as has been described, of a casing provided with two channels of different capacities and with two gates arranged as described, the whole being constructed and operated substantially as and for the purpose specified.

25,860.—Charles A. Wilson, of Cincinnati, Ohio, for an Improvement in Thermostats:

I claim a tubular thermostat, forming a part of the steam or other passage to be regulated and adapted by means of the unequal expansion of the metals of which it is composed, to close the said passage by lateral deflection, as explained.

25,861.—Geo. W. Yerby, of New York City, for an Improvement in Bustles:

I claim the bustle as described, in which the waistband has a back piece, S, and a corset or part corset, n, in front, provided with one, two or more sets of pockets, into which the springs of the bustle are inserted, the whole being constructed and operated in the manner and for the purpose substantially as described.

25,862.—James M. Adams (assignor to himself and Alonzo Johnson), of Canton, Mass., for an Improvement in Weeding-hoes:

I claim the arrangement of the two blades with the bifurcated handle, the whole being constructed in the manner and for the purposes set forth.

25,863.—Benjamin L. Agnew (assignor to G. P. Reed), of Indiana, Pa., for an Improvement in Preserve Cans:

I claim the combination, in a preserve jar, of a deep outer flanch or rim, E, with a shallow inner flanch, B, in the manner and for the purpose described.

25,864.—John G. Baker (assignor to himself and Asa L. Carrier), of Washington, D. C., for an Improvement in the Rods of Window Blinds:

I claim the peculiar construction of thin metallic tubes, the two edges so forming the ears or rings, e e e, in combination with wire staples or rings, to connect wood slats for movable blinds, substantially as set forth.

25,865.—Barron Davis, of Brooklyn, N. Y. (assignor to Osborn & Vincent, of New York City), for an Improvement in Bustles:

I claim attaching the hoops, c d e, &c., to the extension, B, by fixed and immovable connections, so that the hoops cannot be thrown forward or outward, when the hoops are connected to the band, A, by means of the cross-bands, g g, in combination with the back point or extension, C, as and for the purposes set forth.

25,866.—J. Burrows Hyde, of Newark, N. J. (assignor to Phebe Bamman, of same place), for an Improvement in the Method of Making Gas from Peat:

I claim, first, Exposing such peaty matter to thorough desiccation by artificial heat, and conveying it to the retort without permitting it to absorb moisture from the air.

Second, Granulating or powdering such peaty matter, distilling and cooling it in closed cases, as described.

Third, Employing the heat evolved in cooling the carbonized material to aid in desiccating the peaty matter, as described.

25,867.—John Maclure, of Newark, N. J. (assignor to himself, Samuel E. Tompkins and Samuel C. Northrup, of same place), for an Improved Machine for Covering Saddle-trees:

I claim the employment of an elastic bed or cushion, D, in combination with the cover and seat, J, substantially as and for the purpose described.

Second, The arrangement and combination of the box, B, adjustable sliding-bars E, elastic cushion, D, seat, J, clamp, K', and pressing-lever, G, as and for the purpose shown and described.

25,868.—S. W. Palmer and J. F. Palmer, of Auburn, N. Y. (assignors to S. W. Palmer, N. Palmer and John Patty, of same place), for an Improved Clothes-frame:

We claim, first, Hinging the arms of a clothes-frame to the sliding hubs by means of the pins, d, which are supported by the open lugs, C, when the said arms are constructed and the several parts arranged substantially in the manner and for the purpose described.

We also claim, in combination with the shaft and its grooves, the sliding catch-ring, F, with its spring, h, and projection, i, for retaining the frame in its position, substantially as described.

We also claim, in combination with the central post or shaft and sliding frame, the hoisting-apparatus, consisting of the clutch-rings, k and m, with their springs, o, lever, p, and link, q, substantially in the manner and for the purpose described.

25,869.—Conrad Roder, of Ceralvo, Ky. (assignor to himself and J. F. Iler, of same place), for an Improvement in Fancy Looms:

I claim the combination and arrangement of the double catch-hooks, h h', adjustable guide-plate, j, the sash, E and J, with the lifting-bar, k, in the manner and for the purpose described.

25,870.—Wm. Daniel Sloan, of New York City (assignor to A. B. Chapman, of same place), for an Improved Clasp for Skeleton Skirts:

I claim the clasp, c, for uniting the tapes or galloons to the hoops in skeleton skirts; said clasp being formed with a narrow ribbed or V-shape back-piece, 2, for the purposes specified.

25,871.—James Speers, of West Manchester, Pa. (assignor to himself, Alexander Postley and John Webbe, of Alleghany county, Pa.), for an Improved Paddle-wheel:

I claim the arrangement of the flanges, a and a 1, the arms, b, with points, x, the braces, c, and floats, d, when used for the purpose of constructing a propeller, substantially in the manner set forth.

25,872.—Stephen F. Van Hagen, of Albany, N. Y. (assignor to George Kilbourne, of same place), for an Improvement in Banjos:

I claim the combination, in one instrument, of the banjo parchment-covered open body, with the neck and fretted finger-board of the guitar; the thumb-string of the banjo being added to the usual strings of the guitar, substantially in the manner and for the purpose set forth.

I also claim the formation of the front part of the body of the instrument, of an acute oval or lancet form, in the manner and for the purposes set forth.

RE-ISSUES.

Squire M. Fales, of Baltimore, Md., for an Improved Furnace for Smelting Iron. Patented Feb. 8, 1859; re-issued Oct. 18, 1859:

I claim, first, The combination, with the cone of a furnace, of one or more arched recesses or chambers, A A, substantially as and for the purpose set forth.

Second, The combination of the opening, I, with the crown of the arch, A, substantially as and for the purposes set forth.

Third, The combination with the arch recess, A, opening, I, in the crown of the same, of a movable tymp, B B, to be applied to the outer ends of the arched recesses or chambers, A A, instead of the permanent tymp now in use, which movable tymp is kept in place by a cross-bar that can be removed at pleasure, substantially as and for the purposes set forth.

[This invention consists in enlarging the furnace below the base o the stack, so that the blast has a chance to circulate laterally before it passes up into the stack. Enlarging the furnace at its base also allows of vertical flux passages being provided in this character of furnace; and likewise of removable tuyeres, which allow ready access to the interior of the furnace, being used, and renders an ordinary stack furnace capable of melting old railroad bars, &c., as well as all kinds of ores, and reducing the same to the most profitable condition. By circulating the blast, it has been found that very important results are obtained.]

Charles B. Waite and Joseph W. Sener, of Fredericksburg, Va., for an Improvement in Coffee-pots. Patented April 22, 1856; re-issued Aug. 10, 1858; again re-issued Oct. 18, 1859:

We claim the employment, in a condensing-boiler, in which the water in the condenser is impregnated with the aroma of the coffee or other articles under treatment, of a siphon, or equivalent self-acting device, for the discharge of the contents of the condenser into the body of the boiler, substantially as described.

Holly Skinner, of Huron, Ohio, for an Improved Calendar Clock. Patented March 2, 1858; re-issued Oct. 18, 1859:

I claim, first, The extra movable tooth, m, and leap-year wheel, G, applied to or controlled by the year-wheel, F, to operate in the manner described, for the purpose of regulating the effective length of the tooth which represents the month of February.

Second, The arrangement of the month-wheel, C, its attached pinion, t, and pin, 4, the rack-bar, H, and its pawl, q, the spring, v, or its equivalent, the lever, D E, and its stud, i, or their equivalents, the catch, k, or its equivalent, and the stop, 7; the whole being applied

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to operate upon and be controlled by the year-wheel of a calendar-movement as and for the purpose set forth.

Third, Arranging the month-wheel in such a manner that the same, at the end of each month, returns to its original position by the action of a spring, or its equivalent, gathered up or strained by the action of the clock-work, substantially in the manner and for the purpose described.

Wallace Wells, of New York City, for an Improved Construction of Cylinders and Pistons for Pumps and Steam-engines. Patented Oct. 12, 1858; reissued Oct. 18, 1859.

I claim the combination of the cylinder, open at both ends, with three pistons and their connections, arranged substantially as set forth.

Charles Weston, T. F. Weston and John W. Weston, of Salem, Mass., for an Improvement in Leather-finishing Machines. Patented Sept. 25, 1855; reissued Oct. 18, 1859

We claim, first, In machines for finishing leather, the employment of a soft elastic bed, substantially as described.

Second, The combination of an elastic bed and tool, both constructed and operating together to produce the desired effect upon the leather, as set forth.

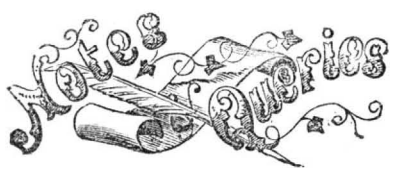
Third, In combination with the soft elastic bed and elastic finishing-tool, the cord, p, secured to the tool-stock, for the purpose of keeping the tool clear of the leather during its retrogtade movement over the bed, as set forth.

Aretus A. Wilder, of Detroit, Mich., for an Improved Clapboard Machine. Patented Oct. 30, 1855; reissued Oct. 18, 1859:

I claim re-sawing and bringing plank to an equal width at the same time.

Second, The flange-rollers, with their springs or equivalents, in combination with the adjustable back-rest, for the purposes described.

ERRATUM.—Last week, in a comment on the claim of H. B. Knowles, for an attachment to the treadles of sewing-machines, the words "slipping on to" were erroneously used for "stopping on."



A. A. of Md.—An Indian dart, 10 inches long, would be of value in a collection of Indian curiosities; but it is doubtful if any considerable sum of money could be obtained for it. In regard to the tooth weighing three and a half pounds, which has been found in the neighborhood of Clear Spring, a comparative anatomist would determine the size, nature and habits of the animal from a thorough examination of the tooth; but, wonderful as are the triumphs of science, none of these things could be decided from the mere weight of the tooth. If you will give us a minute description of the earth in which the tooth was found, and of the geological formation of the district, we can answer with more confidence your question concerning the probability of finding the other bones of the animal in the vicinity.

E. W. S., of Conn.—Electro-magnetic engines of small size are manufactured by all the philosophical instrument-makers in this city. They can be made of any size desired, but those now sold are simply toys.

C. P. G., of Conn.—There is no substance named "alcarnet," but alkanet. It is a coloring root, and of no essential use in your liniment for sprains.

J. W. B., of Md.—The way to calculate the power of an engine, is to multiply the area of piston, in square inches, by the average steam-pressure, in pounds, and by the velocity of piston, in feet, per minute; and divide by 33,000. The resultant is the nominal horse-power of the engine.

S. S. S L., of N. C.—The best method of electro-plating on iron, is to coat the bright iron first with a thin deposit of copper in a battery, then deposit the silver on the top of this from a silver solution with a Smee's battery.

S. C., of N. Y.—A current of hot air driven through a barrel which has become musty desiccates it completely, and removes the smell. The forcing of products of combustion from a charcoal or a wood fire through musty barrels, we believe, will also remove the offensive smell.

F. W. B., of Mass.—We are not acquainted with any elastic varnish that cannot be acted upon by oils.

J. A. F., of Ala.—When steam is worked expansively in a cylinder, a portion of it is condensed, as you state, and gives out its latent heat to superheat the remaining steam. This is now admitted by scientific engineers.

O. H. K., of Minn.—By evaporating your cane-juice in a water-bath, the temperature will never exceed 212° Fah., and the sugar will be prevented from being scorched. The process will be slow, and this is the chief objection to it. Hot air would be a more rapidly concentrating agent than water, but you may find it difficult to regulate the temperature.

G., of N. Y.—Plaster, in its native rock, before it is calcined, contains about 21 per cent. of water; and if it is heated to 270°, this water is all driven off, causing an appearance of boiling. The plaster falls into a white powder, which is called boiled plaster, and which absorbs water very rapidly, solidifying it, the whole mass becoming hard as an ordinary plaster cast. If the plaster is heated above 400°, it is burned, and then requires time to solidify.

Mrs. A G. B., of —— —You can get india-rubber gloves of D. Hodgman, 27 Maiden-lane, corner of Nassau-street, this city at 75 cents per pair. The most quiet and efficient way to preserve your piano from impolite meddling will be to keep it locked.

J. H. W., of N. Y.—Aluminum, though it had long been suspected to be the metallic base of alumina or clay, was first separated by Wohler, a German chemist, in 1827. He, however, only succeeded in producing it as a grey metallic powder, and M. Deville, of Paris, was the first who obtained it, in 1854, in metallic masses so that it could be wrought. Like all the metals, it is a simple substance, and has no "component parts." It has the characteristic property of the precious metals; that is, it is not readily oxydized or rusted, and is more calculated to supersede silver than any other of the metals. Common clay is the ore of aluminum, the metal constituting about one-fourth of the clay. It is also one of the constituents of all the alums.

C. M. W., of Ohio —You cannot now obtain a patent for a device which was patented in 1854 by another party, though you are undoubtedly the prior inventor. Where a party suffers his improvement to be thrown open to the public for more than two years prior to applying for a patent, he cannot obtain a grant therefor. Your invention having been publicly exposed at the Patent Office for more than two years, you are debarred from a patent.

J. S. C., of N. Y.—When a gun is discharged, the solid particles of powder are converted into gas, which is heated, at the same instant, to the temperature of flame, thus increasing the volume enormously, and causing a pressure of some 20,000 pounds to the square inch in every direction. This pressure acts on the breech of the gun as soon as it does on the ball, causing a recoil as soon as the bullet starts, and before it leaves the gun. You must misunderstand Silliman and Olmstead in the second statement which you attribute to them. The velocity of a falling body is continually accelerated. The force of the gravity of the earth which is exerted at its surface causes a body to fall 16 feet in the first second, 32 in the second, 48 in the third, 64 in the fourth, 80 in the fifth, and thus constantly increasing 16 feet in each second.

H. L. G., of La.—Make no apologies for addressing us. We are pleased to come thus in direct intercourse with our readers. You will see, by the SCIENTIFIC AMERICAN, that the steam plow is attracting much attention, and that Mr. Fawkes has been exhibiting his at various places about the country, and at the fair of the American Institute, in this city.

A. F. O., of N. Y.—To your question, "Suppose an apple, or any other fruit, were confined in a vessel hermetically sealed, from which every particle of air had been excluded, would it ever decay, or would any change whatever take place in it?" we reply, it would depend entirely upon the temperature. If it were kept frozen, it would not change. Remains of elephants are found in the ice of the polar regions, of which the hair, skin and flesh are perfectly preserved; the Exquimaux having fed their dogs on the flesh. These elephants must have lived hundreds of years ago, and, possibly, before the creation of man. If fruit, confined as you describe, were heated red-hot, it would be immediately decomposed into its elements, which are principally oxygen, hydrogen, nitrogen and carbon; and at intermediate temperatures the rapidity of the decomposition would be proportioned to the hight of the temperature.

J. H. V., of Wis.—From your account, it would be easy to imagine several reasons why the glazing does not adhere to your pottery; but probably the principle one is the presence of vegetable matter in the loam which you use. The glaze of the best English pipe-clay or cream-colored ware is composed of 53 parts of white lead, 16 of decomposed feldspar, 36 of ground flints, and 4 of flint glass, rubbed or ground with water into a thin paste. Probably, ground quartz would answer in the place of the flints.

S. S. M., of S. C.—Your question in regard to heat could be replied to only at considerable length, and we will receive your inquiry as a suggestion to write an article on the subject soon; it has been extensively investigated, and is very interesting. The tails of comets generally point from the sun, so that when they are receding they push their tails before them. Appearances do indicate that the tails are hollow, but this is not probably owing to the comet's shadow, most comets not being sufficiently dense to cast a shadow, even the light of the stars passing through them freely. The tails of comets are very mysterious: they seem to be subject to forces which do not manifest themselves on this earth. The earth, in its revolution around the sun, revolves about the common center of gravity of the earth and the sun, which is a point within the body of the sun near its center. If the earth were annihilated, with all its inhabitants except one man, his body would revolve about the common center of gravity of the sun and the body, which would be a point nearer the center of the sun than that about which the earth revolves. The orbit would be nearly the same as that in which the earth revolves, and would be elliptical. The cause of the ellipticity of the earth's orbit is wholly unknown. It is now growing very slowly less elongated, and will continue to do so for some thousands of years, till it becomes nearly or quite circular, when it will gradually return to its present shape, and will thus continue to oscillate forever.

Money Received

At the Scientific American Office on account of Patent Office business, for the week ending Saturday, Oct. 22, 1859:—

A. E., of Mich., $25; F. & L., of Pa., $10; A. E. B., of N. Y., $30; G. A. L., of Mich., $30; J. J. K., of Miss., $30; L. B. D., of Ohio, $30; B. M. C., of Mass., $30; W. F., of N. Y., $25; L. M., of Ga., $25; M. & A., of R. I., $30; A. J. B., of Ky., $25; J. H., of N. J., $30; L. P. H., of N. Y., $32; G. M., of N. Y., $30; J. A. A., of Ill., $30; J. C. of Maine, $30; J. D., of Ill., $30; W. S. M., of Conn., $25; W. H. C., of S. C., $35; J. J. R., of Ill., $30; G. A. N., of N. Y., $100; H. W. W., of Cal., $10; C. G. B., of N. Y., $30; W. D. B., of Ohio, $30; O. M. A., of N. Y., $57; W. T. J., of Ill., $42; P. N. B., of N. Y., $30; H. K. S., of Mass., $35; G. B. M., of Mich., $30; P. K., of Conn., $22; E. & R., of Ill., $30; Mrs. C. A., of N. Y. $25; K. & R., of Texas, $55; T. B. & Co., of Va., $30; A. F., of N. Y., $20; W. H. B., of Pa., $25; J. S., of D. C., $20; H. S., of Pa., $40; T. C. R., of N. Y. $55, J. L. B., of S. C., $25; E. & H., of N. J., $25; W. & Sons, of Conn., $57; R. L. R., of Pa., $30.

Specifications, drawings and models belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Oct. 22, 1859:—

A. R. B., of Conn.; W. D., Jr., of Pa.; H. W. C., of Conn.; J. R. & C. H. S., of Conn.; W. H. B., of Pa.; A. J. B., of Ky.; H. S., Jr., of N. Y.; W. & Sons, of Conn.; J. E. S. of Maine; W. S. M., of Conn.; J. D., of Pa.; H. W. W., of Cal.; L. M., of Ga.; J. L. B., of S. C.; L. P. H., of N. Y.; G. M., of N. Y.; Mrs. C. A. of N. Y.; G. & R., of La.; J. J. K., of Miss.; R. T. S., of Ga.; P. D., of R. I.; J. B. T., of Pa.; H. K. S., of Mass.

Hints to our Patrons.

BACK NUMBERS. — We shall hereafter commence sending the SCIENTIFIC AMERICAN to new subscribers from the time their subscriptions are received, unless otherwise directed; the back numbers can be supplied from the commencement of the volume to those who may order them. It is presumed most persons will desire the back numbers, and such as do will please to so state at the time of sending in their subscriptions; they can, however be supplied at any subsequent period.

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MURRAY'S STAMPING-MACHINE.

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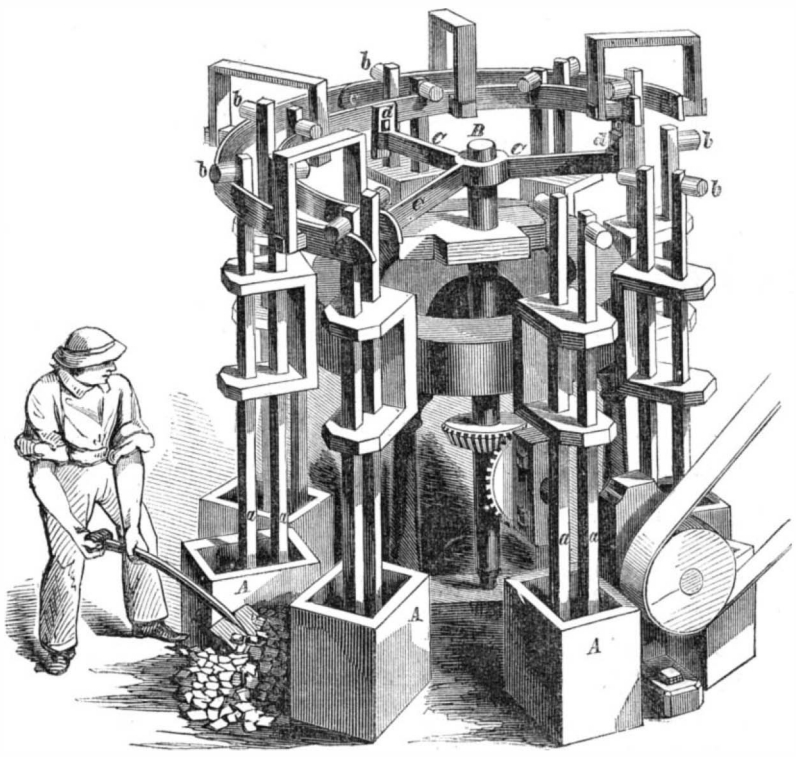

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The boxes A A A, containing the quartz or other material to be pulverized, are arrangedin a circle, and in each box are two stamps, *a a*, standing in the line of the radii, which stamps are raised and dropped by the following described device. In the center of the circle, turned by machinery, is an upright shaft, B, with three arms, C C C, extending horizontally from its top; said arms carry two inclined cams, D D. Each stamp has, at its upper end, a horizontal arm furnished with a friction-roller, *b b b*. The lower ends of the cams pass under these rollers and, as the cams revolve, the stamps are gradually raised till the upper ends of the cams pass from under the rollers, when the stamps fall and give a blow to the quartz or other material in the boxes.

Arrangement is made for varying the hight to which the stamps are raised, and consequently the force of the blow, at the will of the operator. For this purpose each cam is provided with a vertical joint in the middle, and the vertical plate of metal, *c*, which connects the upper ends of the cams with the supporting-bar, C, has a long slot through which the set-screw, *d*, passes, and confines the cam at any hight to which it may be adjusted.

This stamping-machine is the invention of William Murray, of Baltimore, Md., who obtained his patent August 23, 1859. For any further information in relation to this invention please address the inventor at No. 151 North High-street, Baltimore, Md.

DO WATER-WHEELS RUN FASTER BY NIGHT THAN BY DAY?

MESSRS. EDITORS:—I observed in No. 13, "new series," of your paper, an article headed "Work of Water-wheels by Night and Day," representing a number of experiments on water-wheels at high and low meridian, which resulted in demonstrating that mills run no faster by night than by day. I hold a different opinion, notwithstanding the demonstration; and more than one set of experiments will be required to change it, for the following reasons, to wit: First, what has been so universally observed and spoken of for ages most likely has some foundation in truth; second, the water which propels the wheels of mills is unequivocally heavier at midnight than at midday, by the difference of the sun's attraction, doubtless; third, at midday evaporation is going on fast, and, in many cases, the supply of water is sensibly diminished; fourth, at midday the water is warmed and expanded; hence the same weight of water will not enter the shute or aperture at the same time. The preceding reasons must hold good until equally strong or stronger ones are produced.

J. W. K.

Raymond, Miss., Oct. 1, 1859.

[We will reply to the above reasons *seriatim*, with the preliminary remark that we value more highly one experiment rationally, carefully and thoroughly made, than we do the *a priori* reasoning which would fill 10,000 volumes.

1. The fact that an opinion has been held by large numbers of people is very little evidence, indeed, of its correctness. How many millions have believed, and still believe, in the divinity of Brahma? How many intellectual men believed in Mars and Venus, and all the gods and goddesses of the ancient heathen mythology? How many absurd superstitions, in regard to good and bad luck, and kindred follies, are widely believed at the present day among our own people? The opinion that a change in the weather is apt to accompany a change of the moon is very generally held in this community, long after the multitude of observations collated by Herschel have shown that there is, in fact, no foundation for it whatever.

2. The point in regard to the sun's attraction is sound. The different velocities, however, of the moon and the earth, as well as the comparatively small amount which the spring and neap tides vary from ordinary tides, prove that the attraction of the sun on the water is less than that of the moon.

3. That the evaporation is greater in the daytime than in the night is unquestionable; and this would affect slightly the amount of water flowing in the stream—so little, however, that it would generally be overbalanced by the closing of the gates at the works, up the river. Furthermore, the flow of the water in the stream is a different question from the one in regard to the amount which can pass through the wheel when there is a full supply.

4. Careful experiments by several observers have shown that water expands and contracts very little with the change of temperature. We give Hallstrom's table, which shows that the greatest density is at about 39½° and that 1,000 gallons at this temperature would measure 1,004 gallons at 86°:

Temperature.	Volume.
32°	1.0001082
35.6°	1.0000281
39.2°	1.0000002
39.38°	1.
41°	1.0000050
50°	1.0002200
59°	1.0007357
68°	1.0015490
77°	1.0026483
86°	1.0040245

The sensible heat of water is not varied so quickly as that of air, and the temperature of a river would not probably vary enough, in the course of 24 hours, to affect the water which would pass through a wheel to the amount of a single quart.

Two of the influences cited by our correspondent undoubtedly tend to cause water-wheels to run faster in the night than in the day; but these influences are so slight that they may be wholly imperceptible, or they may be balanced by opposing forces. The experiments of our Pepperell correspondent show that, in his cases, these influences were *more* than balanced by such forces. —EDS.

THE BOSTON MECHANICAL BAKERY.—In the Supreme Court, on the 19th inst., the case of Joseph G. Russell against the Firemen's Insurance Company was called up, agreeable to assignment, when the counsel for the defense stated that the suit would not be contested, and no opposition would be made to a recovery of judgment. The case was one in which the office insured the building known as the Mechanical Bakery, which was destroyed last winter, under circumstances which induced a fire inquest jury to bring in a verdict of incendiarism, and the offices to refuse payment on insurance taken. Since then, however, all parties are apparently satisfied that such suspicions were unjust, and Mr. Russell, who was insured in the Fireman's, City, Eliot, North American, Howard, Roger Williams, Arctic, Phenix and Lamar offices, will receive his full insurance of $75,000.—*Boston Herald.*

SOUTH CAROLINA INSTITUTE FAIR.—We are informed that Messrs. S. A. Heath & Co., of the Inventors Exchange, 37 Park-row, this city, will receive and forward articles for exhibition at the South Carolina Institute Fair, which commences in Charleston, Nov. 15th. All articles should be sent to those gentlemen in time to get shipped by Nov. 8th., if intended for competition. It is the intention of Mr. Heath to attend the Charleston Fair, and this will afford a convenient opportunity for parties who desire an experienced and competent person to superintend the exhibition of their inventions. Those having articles adapted to southern trade, and who desire to exhibit, would do well to consult with Mr. Heath, previous to his leaving for Charleston.

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